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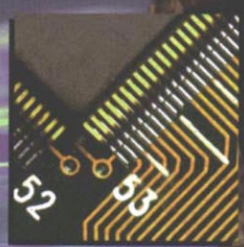

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Volume 9, Number 5

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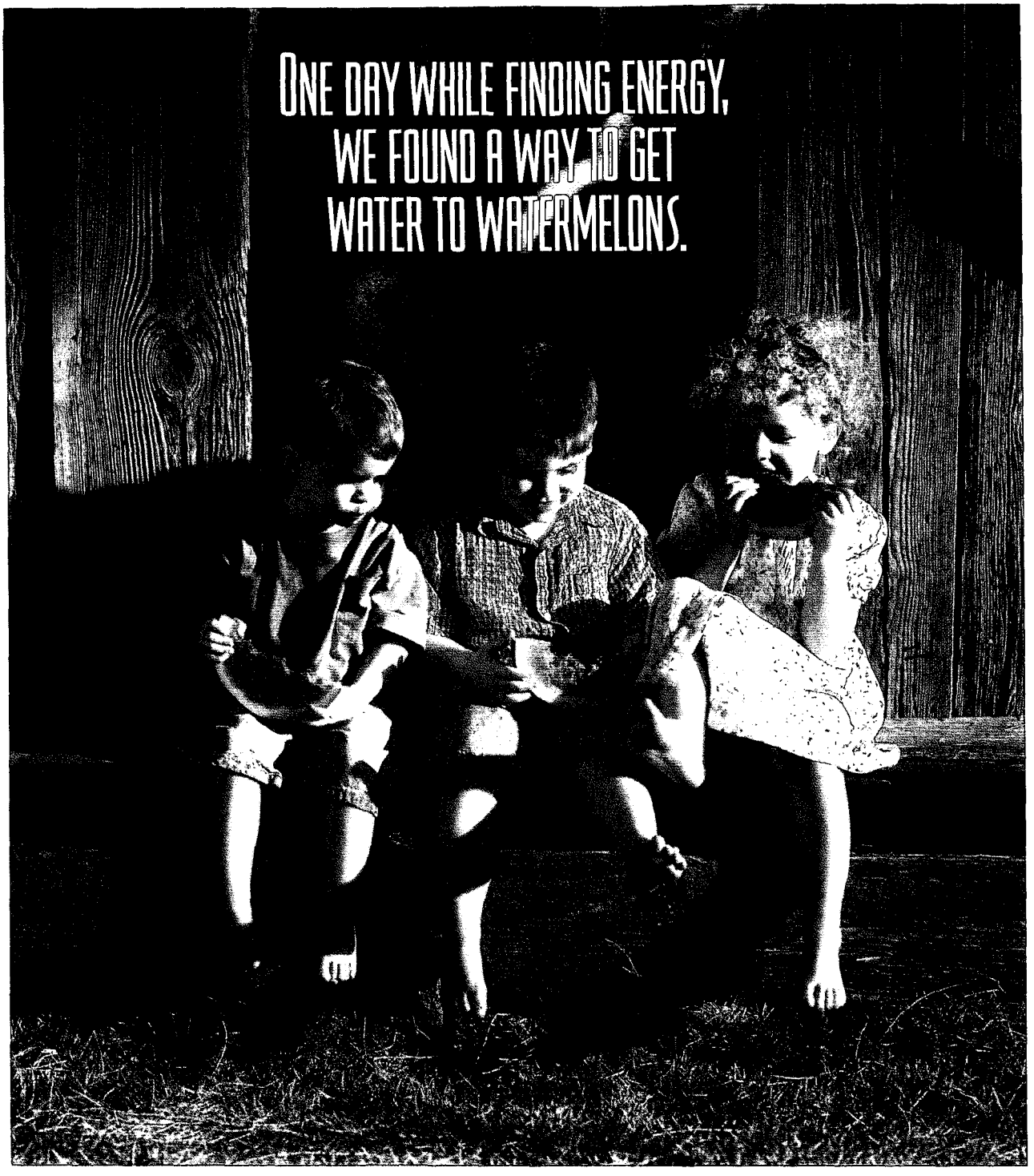

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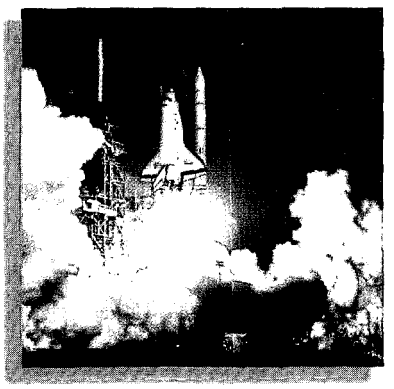

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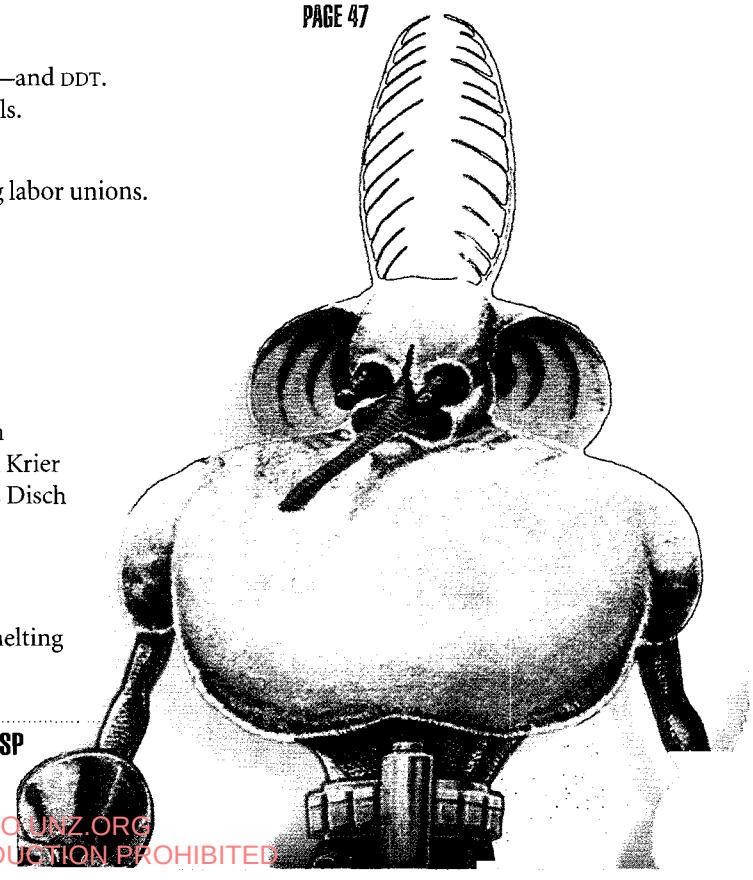

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THE AMERICAN ENTERPRISE

A National Magazine of Politics, Business, and Culture

September/October 1998 Vol. 9, No. 5

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THE AMERICAN ENTERPRISE
(ISSN 1047-3572), published bimonthly by the American Enterprise Institute for Public Policy Research, 1150 17th Street N.W., Washington, D.C. 20036. Periodicals postage paid at Washington, D.C., and additional mailing offices. Copyright © 1998, the American Enterprise Institute. All rights reserved.

POSTMASTER: Send all subscription correspondence and address changes to The American Enterprise, P.O. Box 7144, Bensenville, IL 60106-7144.

LETTERS TO THE EDITOR
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www.TheAmericanEnterprise.org

PRODUCTION AND BUSINESS OFFICE
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1150 17th Street N.W., Washington, D.C. 20036.
(202) 862-5886.

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23 Hurd Street, Cazenovia, NY 13035.
(315) 655-1033.

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Bird's Eye

Robert Royal

Science to a Higher Power

Science is knowledge. And knowledge, as Francis Bacon first urged us to believe, is power. The equation must have seemed doubtful, even slightly mad, when Bacon pronounced it in the early seventeenth century. In the twentieth, it is a commonplace. The man in the street—who unfortunately now is more often in front of the television set—may mildly resent some scientific developments, but he knows that the scientists have got hold of something earthshaking. The woman in the graduate seminar has read her post-modern philosophers and decided, with a vengeance, that power will be hers too. Power, its use and abuse, is also the old and perennial political game. But when the politicians and the rest of us defer to the scientists in any other field than pure science, that game is up.

And what game is that, the scientific skeptic and modern politician may ask? A good question, and one with no scientific answer if we assume that knowledge only comes from science, as science has been understood since Bacon.

It was not always thus. When Western science began in Greece, it was closely allied with a kind of natural contemplation. The Pythagoreans believed that the numbers they found in the seeming chaos of nature reflected a divine presence hidden in the world. Music, they discovered, was an intuitive use of natural mathematical relationships whose interplay creates marvelous structures that seem to put the soul in tune with the world. Ancient, medieval, and modern classical composition, jazz, Indian ragas, rock, country music, and even children's playground songs were all based on that natural harmony inscribed in the very nature of things, until some twentieth-century composers tried to do without such a natural ground. The result, like other modernist aesthetic and social experiments that ignored nature, can only be described as a disaster.

Modernist music, however, was merely a symptom of a large scientific detour that was probably unavoidable. That great genius Isaac Newton—when he was not writing his commentary on the prophecies in the Book of Daniel—opened up an entirely unexpected universe. Newton was a believer and considered his discoveries in physics in much the same way the ancients did their own discoveries, as revealing the divine order of the creator. Alexander Pope's famous epitaph for Newton expresses how many contemporaries must have felt: "Nature and Nature's laws lay hid in night: God said, Let Newton be! And all was light."

But while it was no part of Newton's intention to suggest that the world was anything other than the creation of God, with the consequences that that view entails for individuals and societies, something else was lurking in the background.

The demise of the old Earth-centered universe shook the natural order that had seemed to underwrite the human one. In *An Anatomie of the World,* the poet John Donne, who died before Newton was born, intuited the coming shift of the new natural philosophy:

> And new Philosophy calls all in doubt,
> The element of fire is quite put out;
> The sun is lost, and the earth, and no man's wit
> Can well direct him where to look for it…
> Tis all in pieces, all coherence gone;
> All just supply, and all relation:
> Prince, subject, Father, son, are things forgot.

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Donne may well have been the first Western figure to sense that, despite the religious beliefs of men like Copernicus, Kepler, and Galileo, a new universe was being discovered that demolished the basis on which human institutions had long been built. Even in the early seventeenth century the new outlook seemed to threaten families, social order, religion, and the very coherence of human understanding of our own place in nature.

IT IS NOT UNCOMMON TO HEAR PARTICLE PHYSICISTS AND COSMOLOGISTS TODAY SPEAKING IN TERMS THAT EARLIER WERE THE STOCK IN TRADE OF THEOLOGIANS AND MORAL PHILOSOPHERS.

For a time, at least, life—particularly human purposes and value—seemed to escape being ground up in the mechanistic universe. But it was not long before that last bastion was stormed. The French physician and philosopher La Mettrie wrote in his *L'homme machine* that we are mere machines perpendicularly walking. Enlightenment Deism posited God as a kind of absentee landlord, useful to get things going, but otherwise uninvolved and perhaps uninterested. It was only a short step from that last remnant of divinity—and meaning—to Laplace's arrogant claim that if we could know the position and direction of every particle in the universe, we could predict the future with absolute certitude. When Napoleon asked Laplace where God fit into this machine, Laplace famously answered, "Sire, I have no need of that hypothesis."

In the nineteenth century, probably no figure contributed more to the closing scientific circle around the human world than Darwin. Darwin's true discoveries, of course, are many and useful, even if their philosophical basis remains in dispute. Species did arise through some sort of evolution. Can we really say, though, that the vast proliferation of life on Earth is the result of natural selection from random variation? Natural selection does occur; nature kills off poorly adapted species without remorse all the time. But does random variation explain the origin of life? In fact, does the idea of a random universe, with its iron laws, explain anything at all?

That is the question with which we entered this century. And a number of developments in science indicate that we are making the turn to a new conception of the world as far-reaching in its scope as the changes inaugurated by the great figures of the seventeenth and eighteenth centuries. Perhaps even more remarkable than the new science itself, the new universe story seems poised to put an end to the 300-year detour, necessary in its way for us to come to an exact understanding of nature, which had previously been shrouded in vague speculation. The cost of our growth in physical knowledge was a temporary loss of the world of meaning. But meaning in nature is returning with a vengeance and bids fair to return us to the main road where the macrocosm of the universe and the microcosm of man will co-exist in a harmony both new and old.

The impulse towards this revisioning of nature comes mostly from physics. Laplace, for example, we now know was simply wrong. Quantum mechanics has demonstrated that we *cannot know* the position and direction of every particle in the universe. Nor is this merely a limitation of our current technology. Matter, while still displaying the large regularities we observe in the world around us, is complicated, elusive, and inherently unpredictable at a sub-atomic level. At the other end of the scale of matter, we now know that the universe has a beginning and a history and a direction, much as the Bible and other traditional cosmologies maintained. Taken together, these micro and macro level discoveries have changed everything. That is why it is not uncommon to hear particle physicists and cosmologists today speaking in terms that earlier were the stock in trade of theologians and moral philosophers.

These discoveries about physics have significance in biology as well. As Frederick Turner and Dean Overman indicate in this issue, life—particularly human life—is characterized by an encoding of information (an unfortunately lifeless term suggesting computers) and meaning (a more properly human term) into the humble dust and clay from which all living things have arisen. Overman's brilliant book *A Case Against Accident and Self-Organization* will demonstrate to any unprejudiced reader that the universe we know could hardly have arisen by chance. The random interactions between matter that once were believed to explain the rise of complex organisms could have done no such thing. The astronomer Sir Fred Hoyle, one of the first to do the mathematics, was shaken in his own atheism when he beheld the statistical improbability of the accepted view. Matter in itself can achieve order of a simple kind such as crystals or the whorls of water in a draining tub, but not the kind of complexity we observe in living things and in ourselves. Our universe now seems to require design and perhaps even Providence, since to some observers it may have taken the form it has so that someday we would be here.

And then there is the question of mind. Ever since philosophical speculation began, how the mind is related to the material universe has been a vexed question. In the old modern age, philosophical giants like Descartes, Leibniz, and Kant accepted the mechanistic universe described by Newton's physical science and yet tried to salvage the mind and all the human things by agreeing to keep them on as a special preserve, a kind of ghost in the machine, since they could not be accounted for in any other

BIRD'S EYE guest author Robert Royal is vice-president for research at the Ethics and Public Policy Center in Washington, D.C.

Karl Zinsmeister will return in our next issue.

This issue of *The American Enterprise* was edited by Scott Walter.

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way. But modern particle physics has shaken that compromise, as George Gilder writes in this issue. Among the spooky effects of quantum mechanics, scientists now know that observation so to speak "condenses" certain indeterminate states of matter into the everyday reality we know. How this happens is still a mystery. Yet the consequences are far-reaching. Can an elaborate structure of molecules in the human skull affect physical reality merely by observation? And what does observation mean in this context? Whatever the answers to these questions may ultimately be, mind and matter are closer together than in recent centuries—and mind has a new, science-based dignity.

Nonetheless, highly touted neuroscientists such as Steven Pinker of MIT have argued recently that the mind itself is a mere property of matter. And so scientists' inability to give a full scientific account of mind must be because: (1) we just have not evolved enough yet to understand the nature of mind, will, and consciousness; or (2) the mind, suitable for getting along on the African grasslands, is by nature unsuited to the task of unraveling metaphysical origins. These two hypotheses are both deft moves. The first asks for a kind of blind faith: Trust us, we'll get the answer eventually. And, by the way, be quiet. We're thinking. But the second hypothesis threatens the scientific faith. Our brains seem quite developed enough to make stabs at penetrating the origins of the universe in the Big Bang and the continued existence of matter despite counterintuitive, mysterious quantum phenomena. Not things you encounter everyday on the grasslands. But a deep reductivist urge persists in certain scientific quarters and will not easily be dispelled.

Such resistance notwithstanding, the new advances in science return us to a host of ancient questions, requiring us to rethink nature and human nature. In the furrow that I have been plowing recently, religion and environmentalism, it is not uncommon to find thinkers who urge, on the one hand, the new science of the universe and, on the other, a return to tribal drums and Native American ways. The conflict is less stark than at first appears. The old human ceremonies, with their intuitions of powers beyond nature and their drive to understand the meaning of life, are far more compatible with the new cosmos than with Newton's. But the same religious environmentalists fear the offspring of science, technology. How we would have returned to the wider understanding of the world without science and technology, they do not explain. All the same, they are on to an important point.

In *The Abolition of Man*, the English thinker C. S. Lewis makes a striking observation. Aside from the question of how technologies have been used or misused, there is a deeper question more obvious today than in 1943 when Lewis wrote. We are largely on the way to cleaning up the smokestacks, toxic wastes, and other by-products of the early days of industrialization. But what technologies like cloning, genetic manipulation, and mood-altering drugs will do to us as human beings raises the old question of power in a different form. Bacon celebrated using knowledge for the relief of man's estate. One of the paradoxes of that project is that the very attempt to aid us may relieve us of everything that is, properly speaking, human. Or as Lewis put it,

> Man's conquest of Nature, if the dreams of some scientific planners are realized, means the rule of a few hundreds of men over billions upon billions of men. There neither is nor can be any simple increase of power on Man's side. Each new power won *by* man is a power *over* man as well. Each advance leaves him weaker as well as stronger. In every victory, besides being the general who triumphs he is also the prisoner who follows the triumphal car.

The only force that might restrain this juggernaut is the old notion of wisdom. But wisdom seemed a mere illusion in the old mechanistic universe. Even now, despite some new scientific avenues, the quintessentially human things are relegated by much science to the status of mere elaborations of primitive biological drives. Occasionally, a scientist like Edward O. Wilson arises who would like to put all human matters—art, politics, religion, and culture—under the categories of biological science. His project of promoting "consilience," the integration of science and the humanities, is an inherently contradictory one, since, whatever physical science may tell us, it is we who must pick and choose which biological urges to gratify. When you ask Wilson where human freedom comes in, he and his colleagues can only invoke a complex set of algorithms mostly consisting of genes and environment. This answer, though opaque, is scientifically accurate, but hardly a basis for human dignity and freedom, whether in politics or in our mysterious pilgrimage through the world.

What of the humanities themselves? Alas, the disciplines that were supposed to free us from ignorance, impulse, and habit have now largely acquiesced in the belief that relationships are really only about power. Wisdom, justice, truth, sacrifice are, the trendy professors tell us, just so many "discourses" of power, hiding their hegemonic drive under an idealistic wrapper.

So it is difficult to know where to turn. The race between a recovery of wisdom and an ever-intrusive, if enlightened, science and technology will be the great human drama of the coming century. There are many reasons to be pessimistic about the likely outcome of that race. We have seen in this century what the combination of political power and crackpot science can do to millions of people, as Daniel Mahoney reminds us in his article here. More worrisome still in the America of Jerry Springer, Marilyn Manson, and Bill Clinton is the old question of what human beings are willing to do to themselves.

Wisdom is the kind of word that, like the male gaze to an orthodox feminist, makes us uncomfortable. Just knowing it's in the neighborhood reminds us of things we'd rather not have to think about. To say that there is something like wisdom probably means there is something like Truth, and then we have to develop not only intelligence to apprehend that Truth but maybe even virtues to live it. Facts and scientific theories, for all their public effects, are quite private. Most of the time you would need complicated experiments to confirm or deny them. Wisdom, truth, virtue, if they exist, must be intended for everybody, everyday, in every situation. And to recover them, we will need a very different kind of science.

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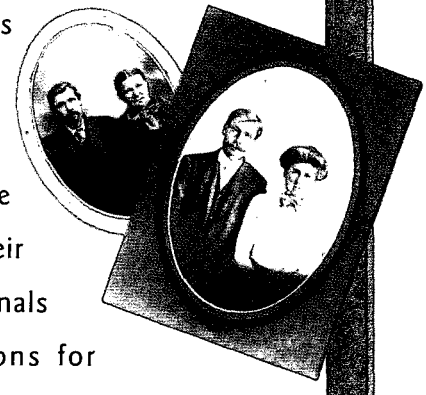
This assignment started in a flea market and ended in a national shrine.

This class boat trip to Ellis Island actually began at a flea market in Rhode Island, where ninth-grade teacher Maureen Whalen Spaight bought a package of old immigrant photographs for $3.00. Later, she had each of her students pick one of the photos and develop a character based on it.



Her students then completely immersed themselves in the immigrant experience by creating journals for each of their immigrant characters. These journals recorded the characters' reasons for immigrating, their doubts, their dreams and the difficulties they and their companions faced as they began life in their adopted country.

For showing her students that a picture truly is worth a thousand words, State Farm is proud to present Maureen Spaight of E. R. Martin, Jr. High School of East Providence, Rhode Island with our Good Neighbor Award and to donate $5,000 to the educational institution of her choice.

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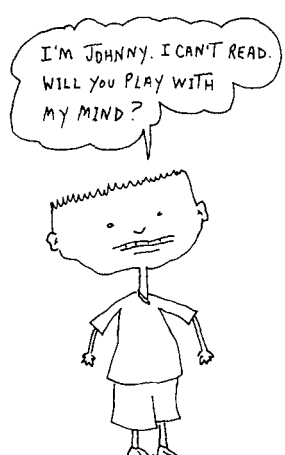
Sidelights

Hale McGee, a candidate for Congress from Los Angeles, was robbed just after he commented on TV that his district had no crime problem. ❧ Urban Decay cosmetics sells nail polishes in novel colors: Acid Rain, Roach, Frostbite, Pallor, Mildew, Oilslick, and Bruise. · · · Hallmark now markets cards for two new occasions: suicides and the death of pets. ❧ A new book for those returning to the simple life: *Living Naked and Frugal: A Handbook for Parsimonious Nudity.* ❧ Questions fielded by the hot line at the Society for Human Resource Management: "Can I fire an employee who brings in an unassembled bomb to work?" "Can we fire an employee who just ran over a customer with a forklift?" "Do we have to allow an employee to bring in snakes because his psychiatrist feels it will help him with his phobia?" ❧ Nationwide, two-thirds of those aged 14 to 19—and 86 percent of African-American high school students—say they want to start a business. ❧ U.S. involvement in Bosnia has caused a National Guard combat unit to be ordered overseas for the first time in almost 30 years; more Army reservists have been called up for active duty in Bosnia than the total called up during Vietnam. ❧ In the wake of CNN's phony sarin gas story, a quotation was going around the Internet attributed to "a Vietnam helicopter crewman": "Do not fear the enemy, for the enemy can only take your life. It is far better that you fear the media, for they will steal your *honor.*" ❧ **Robert Ball**, a former Social Security commissioner who opposes privatizing the system, laments that "there are already 15 privatization plans out there, and it is getting to be dangerous and persuasive." · · · Liberal Senator **Paul Wellstone** (D-Minn.) agrees: "We are now behind the eight ball. They have done a masterful job." · · · Senator **Bob Kerrey** (D-Nebr.) explains, "People want more than just a transfer payment. They want wealth." ❧ Bored with *Newsweek*? Try either *Headpress*, "the journal of sex, religion, and death," or *Anything That Moves: The Bi-sexual Magazine for* FABGLITTER (as in Fetish, Allies, Bi-sexual, Gay, Lesbian, Intersexed, Transgender, Transsexual Engendering Revolution). · · · Baltimore's **Patrick Turner** hopes to launch a "Crash Café" chain of restaurants that "seduces us to look closer, to indulge our undeniable fascination with the destructive, erotic nature" of car crashes, plane crashes, etc. ❧ **Jay Leno** asked two young women on the street if they could name one of the Ten Commandments: "Freedom of speech?" replied the first woman. The other was asked to complete the sentence: Let he who is without sin… "have a good time?" she answered. · · · A Jacksonville, Florida woman was arrested for selling her two-year-old for $10 after she asked police to run a check on the couple who bought her daughter.

A poll of workers by Zogby's Real America found that 24 percent said they had a new or better job because they could use new technology, while 4 percent said technological change cost them their jobs. · · · Almost three-quarters of temps land permanent jobs for themselves, another survey reports. ❧ According to the IRS, taxpayers who itemize deductions gave $84.3 billion to charity in 1996, up 12.4 percent from the year before—"a staggering increase," says **Ann Kaplan** of the American Association of Fund-raising Counsel, New York. ❧ "Everyone is scared but the criminals," Senate Majority Leader **Trent Lott** told the National Rifle Association. "The way to change that is to give the criminals something to be afraid of. That something, in my opinion, is a well-armed public." ❧ "There's nothing [**Clinton**] won't do. He's immune to shame. Move past all the nice posturing and get really down there in him, you find absolutely nothing…nothing but an appetite"—**Jesse Jackson** on the eve of the '92 election. · · · "If the President can do it, why can't we?" a Denver middle school student asked *Time* reporters writing a cover story on teenage sex. ❧ A *Time*-CNN poll found that 65 percent of women don't call themselves feminists, up from 58 percent in 1989. ❧ An Illinois man was convicted of killing his former girlfriend and two of her children, and cutting an unborn child out of her womb in November 1995. The child is still alive and living with his maternal grandfather. ❧ Two Amish men in Pennsylvania were arrested for selling methamphetamine and cocaine to other Amish youths. · · · A University of Maryland researcher studying a large Midwestern state found prescriptions for Ritalin and similar drugs for children five and younger had increased 180 percent from 1991-95. ❧ Houston's affirmative-action director was suspended after she called a city councilman a "midget." The councilman is a dwarf. ❧ For the environmentalist who has everything: In an Australian rain forest, the Daintree Eco Lodge provides "marble-floored, air conditioned treetop lodges, complete with minibars and in-room movies, for as much as $900 a night," the *Wall Street Journal* reports. —*SW*



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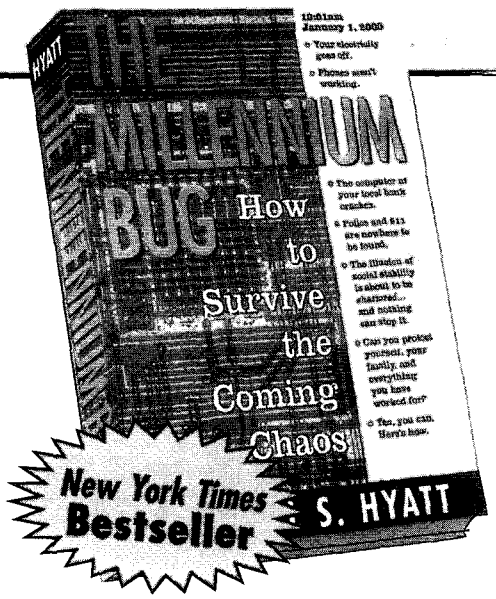

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SCAN

OFF THE LAWYERS' RESERVATION

Even if the estimated 170,000 women suing Dow Corning over their silicone breast implants agree to the proposed $3.2 billion settlement, the final act of this legal drama won't come until late this year. That's when a panel commissioned by federal judge Sam C. Pointer, Jr., will weigh in on what more than a dozen studies have already determined: There is no link between implants and disease.

True, implants can rupture and, like other medical devices such as artificial hip and knee joints, eventually have to be replaced. But something has happened that's not in the trial lawyers' script: Kathleen Anneken, a grassroots leader of her fellow implant patients, has left the reservation.

After plastic surgeons repeatedly botched the operations to replace her ruptured implants, Anneken started the Command Trust Network, a national support group for women who had experienced similar trouble. That was in 1988, when no one, including Anneken herself, could imagine the legal morass that ensued.

She is now highly critical of the plaintiffs' lawyers and others who seem to be exploiting women whose symptoms, ranging from joint pain to depression, could be attributed to other factors, including simple aging. "Once you have implants, how do you know what to blame on them? We're all going to age," Anneken told *TAE*'s John Meroney.

That hasn't stalled lawyers like John O'Quinn. He's turned implant litigation into a cottage industry, grossing an estimated $100 million in settlements, of which O'Quinn reportedly keeps 40 percent. "I was appalled," says Anneken. "I think the lawyers are way out of line. I guess the proof you need in court is different from what I would call the real truth."

With this kind of dissent, it's easy to see why Anneken isn't the kind of "victim" the plaintiffs' lawyers want. Those leading the legal and P.R. war against manufacturers complain that the complicated nuances of their side of the issue are beyond Anneken and her Kentucky roots. But truth be told, it is Anneken who has figured them out. Once she began to see the issue as one of individual responsibility and decided the lawsuit game wasn't for her, she turned the operation of Command Trust over to her one-time colleague Sybil Goldrich, making herself *persona non grata.* Goldrich and Washington publicist David Fenton have taken the group Anneken started in her home and transformed it into a slick front for the trial attorneys. "They work more for the lawyers than they do for us," says Anneken.

One thing Anneken will have to concede: Goldrich and Fenton are more seasoned at the art of spin. Goldrich's anti-implant campaign goes back to a 1988 *Ms.* article and reached epic proportions last year with a slanted Lifetime cable movie that bruised manufacturers' images. Fenton's repertoire reads like a who's who of radical activism: he's handled publicity for yippie Abbie Hoffman, Angola's Marxist regime, and the Nicaraguan Sandinistas. His firm's brightest moment came in 1989 when it publicized exaggerated claims that Alar, a chemical used to improve the color of apples, causes cancer. According to the Food and Drug Administration, it was "one of the worst instances where statements were made without the benefit of scientific review," and the panic cost innocent Washington state apple farmers some $125 million.

The latest wrinkle in the politics of the implant story came in June, just before the possible Dow Corning settlement was revealed. Senator Barbara Boxer (D-Calif.) introduced legislation calling for a government-appointed committee to study implants and their health effects. The bill calls for the President to personally select two women who have or have had silicone implants to serve on the panel, a challenge which even his harshest critics would admit Clinton is up to.

THE SALAD THREAT

"When you outlaw Caesar salad," warns Libertarian party spokesman Bill Winter, "only outlaws will eat Caesar salad." This comment was prompted by California's recent ban on any food that includes raw egg.

Public outrage led to the law's repeal, our contributor Ralph Reiland reports. Flush with victory, Winter proclaimed, "it's a setback for those political eggheads who think they have the right to micromanage every aspect of our lives—down to the type of salad we buy. Hopefully, politicians will learn to just lettuce alone."

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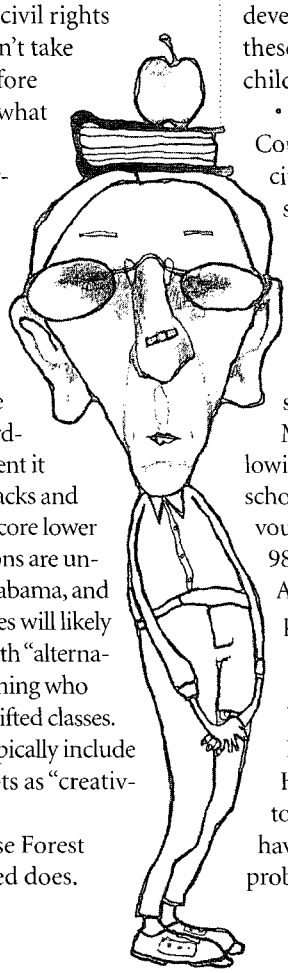
DUMBING-DOWN HONORS CLASSES

The dumbing down of education continues. All across the country, classes once reserved for the best and the brightest are becoming dumb and dumber as admission standards are loosened under pressure for racial and ethnic "diversity." Sadly, special programs for the gifted and high school honors classes are among the few things in public schools that actually work. At least, they worked until Uncle Sam came knocking at the schoolhouse door.

Leading the charge: Norma Cantu, the assistant secretary for civil rights at the U.S. Department of Education. Cantu is best known for trying to force affirmative action on public universities even when such policies had been prohibited by U.S. Supreme Court rulings, voter ballot initiatives, and other technicalities. Her efforts to ensure "diversity" in the nation's primary and secondary schools have attracted less attention but are equally heavy-handed.

In what Office of Civil Rights lawyer Barbara Shannon calls a "pro-active" docket, states whose gifted programs lack sufficient numbers of minorities are investigated for possible civil rights violations. And it doesn't take much investigation before the Department finds what it hopes to change.



Shannon denies coercion. But everywhere from New York City to Atlanta, schools have been forced to abandon the traditional measure for admission to gifted programs—the I.Q. test—because according to Cantu's Department it discriminates against blacks and Hispanics; that is, they score lower than whites. Investigations are underway in Tennessee, Alabama, and Arkansas, and these states will likely be forced to come up with "alternative" means for determining who qualifies for honors or gifted classes. Alternative measures typically include such ill-defined concepts as "creativity" or special abilities.

Today, to paraphrase Forest Gump, gifted is as gifted does. But when giftedness is redefined, the results are rather dismal. In Howard County, Maryland, for example, students in honors classes that are now open to almost anyone have watched a *Taming of the Shrew* video instead of reading Shakespeare's play.

Perhaps they should read education reformer Alan Cromer's new book, *Connected Knowledge.* A physicist by training, Cromer objects to the effort to put "students of all abilities and disabilities into the same classrooms," because it reduces "education to warehousing and will only succeed in driving the more affluent students—black and white—out of public education." In a few years, he predicts, "educators will reinvent ability grouping under a different name."

*—**Evan Gahr** writes regularly on education and culture for* The American Enterprise.

CHOICE VICTORIES

Most parents in low-income neighborhoods have two choices of where to educate their children—the failing government school, or the street. But three recent developments have made it more likely these parents will be able to send their children to a good local private school.

• In June, the Wisconsin Supreme Court ruled it was constitutional for the city of Milwaukee to use vouchers to send children to any private school, even religious ones. Because the voucher funds go to the parents instead of the schools, the vouchers do not violate First Amendment prohibitions against government subsidies for religion, the Court said. Milwaukee officials estimate that by allowing parents to use vouchers at religious schools, the number of students receiving vouchers will rise from 1,500 in the 1997-98 school year to 5,000 this coming year. About 81 parochial schools are expected to join the 23 nonsectarian private schools currently accepting vouchers. "We have 125 students eligible and waiting for vouchers," Brother Bob Smith, principal of Messmer High, an independent Catholic school, told the *New York Times.* "We're going to have a capacity problem, but it's a good problem to have."

• One reason more government vouchers aren't redeemed at private schools are the "Blaine Amendments" in 37 state constitutions which ban government aid to private schools. They were introduced in the 1880s after House Speaker James G. Blaine failed to get a similar prohibition into the U.S. Constitution.

The Becket Fund for Religious Liberty, a public-interest law firm, is trying to overturn Blaine Amendments and has launched a lawsuit to overturn one in Massachusetts. According to Becket Fund general counsel Kevin Hasson, the amendment was added to the state constitution in 1854 when Massachusetts was controlled by the Know-Nothing Party, which rose to power on a platform of attacking immigrants and Catholics.

Blaine Amendments, Hasson says, "have accomplished very well their purpose—to establish a monopoly for one type of school—the government school. Blaine Amendments demonstrate that the opposition to school choice has been bigoted from the beginning. The nature of the bigotry has changed, but it's still bigotry." The Becket Fund hopes to launch anti-Blaine Amendment lawsuits in at least two other states by the end of the year.

• The private voucher movement received a major boost in June when the Children's Scholarship Fund (CSF) was launched with $50 million contributions from investment banker Theodore Forstmann and Wal-Mart heir John Walton. This $100 million contribution will be used to provide matching grants for up to $100 million raised by local scholarship funds.

CSF will help provide 10,000 scholarships in five cities this fall—Washington, D.C., New York, Jersey City, Los Angeles, and Chicago. In an interview, CSF president Douglas Dewey noted that representatives from 50 cities attended a summit held in Houston this summer, which shows that private voucher programs have "moved into the mainstream and become a standard philanthropic movement."

"As a result of what we are doing in education," Theodore Forstmann observed in an interview in *Crisis*, "lots of people are coming together under this issue, from many different back-

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grounds—black ministers, cardinals, rabbis, traditional liberals—they are all tired of seeing children sacrificed for the benefit of political power."

THE RIGHT NOT TO KNOW

How dare they? Long-distance companies like AT&T and MCI have recently begun informing their customers of a tax, euphemistically called the "e-rate," slapped on them by the Federal Communications Commission so that the feds can subsidize computers and Internet connections for rural schools and libraries.

Leave aside the fact that *TAE*'s copy of the Constitution lacks the section granting bureaucrats the right to tax. What's most disturbing is that politicians like Vice-President Al Gore and Senator Bob Kerrey (D-Nebr.), and even champions of the public's right to know like the *New York Times,* are angry that telephone companies are finally letting the public know about this 4 to 6 percent tax on their phone service.

The *Times* snarls at the long-distance companies' "greed" for failing to "absorb" the cost of the tax, especially after Congress has been kind enough to (partly) deregulate their industry. But as AEI president Christopher DeMuth observes, (1) this sort of tax is always paid by consumers in the form of higher prices and (2) the *Times*, which doesn't suffer under the sort of regulation placed on phone companies, "does not show its gratitude by providing its newspapers for free or at reduced rates to schools and libraries in disadvantaged communities on anything like the scale and cost of the e-rate program."

Even the on-line magazine *Slate* denounced the program as counterproductive: "Do we really want to ghettoize rural Internet service as a welfare operation when the best telecommunications policy seems to be to let the market work instead? Cable and satellite TV didn't require subsidies to serve rural customers. Why should the Internet?"

DECLINING DEFENSE

Two recent bits of news, emerging on the very same day, crisply illustrated how Commander in Chief Clinton continues to degrade standards in our armed forces.

In item one, Clinton officials leaked plans to soften the penalties for adultery in the armed services, saying the "military world should not really be so different from the civilian," the *New York Times* reports. This is the same philosophy espoused by Sara Lister, the former assistant Army secretary who resigned earlier this year after dubbing U.S. Marines "extremists."

In item two, Clinton's nominee for Air Force Secretary, Daryl Jones, insisted he hadn't lied when he told Congress that he voluntarily chose to stop flying F-16s in the Reserves. But Jones' former commanding officer, Colonel Thomas Dyches, testified he had grounded Jones for unsafe flying, and Lieutenant Colonel Jack Connelly testified he witnessed the grounding. Pressed, Jones did admit to Congress he had been wildly wrong in the number of hours of flying time he claimed to have in earlier Senate testimony, and that he had collected flight pay for 3½ years after he stopped flying, and that he had worn "command pilot" wings he had no right to wear, and that he may have "accidentally" pressed military subordinates to buy Amway products. (The Senate rejected Jones' nomination.)

Meanwhile, the administration continues to bleed the defense budget and to block necessary advances like work on a system to prevent rogue missiles from hitting U.S. cities.

Who said Bill Clinton hasn't put his mark on the military?

CAN YOU NAME THIS COUNTRY?

In a recent speech at the Shavano Institute, writer Mark Helprin described the following military force:

- 709,000 regular army soldiers
- 293,000 reservists
- 8 regular army divisions
- 2 reserve army divisions
- 20 air force and navy air wings with approximately 2,000 combat aircraft
- 232 strategic bombers
- 13 ballistic missile submarines with 3,114 nuclear warheads
- 500 intercontinental ballistic missiles with 1,950 warheads
- 4 aircraft carriers
- 121 surface ships and attack submarines

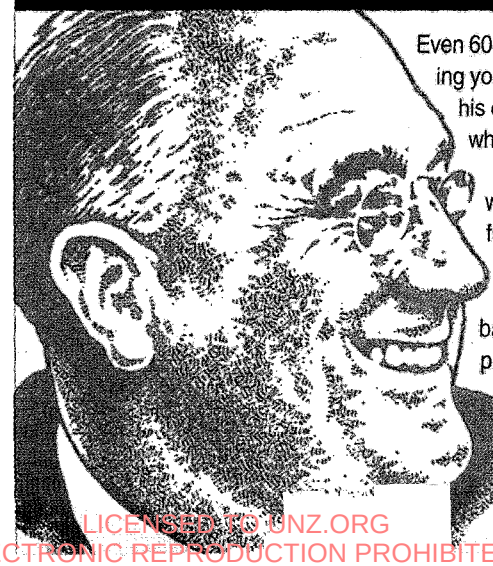
This force all but vanished during the present decade. Its identity? These are the differences between the U.S. armed forces of 1990 and the Clinton administration's proposed, and largely already achieved, "target force."

TODAY JOE CAMEL, TOMORROW THE PILLSBURY DOUGHBOY

Who didn't know they wouldn't stop with tobacco? And who didn't know that Yale would be in the vanguard of the next wave of shaking down politically incorrect companies with deep pockets?

Researchers at Yale are now advocating that junk foods be slapped with a "fat tax." Our "toxic food environment," says Yale professor Kelly Brownell, director of the university's Center for Eating and Weight Disorders, is seducing us into a "diet that is high in fat, high in calories,

TAXING TROUBLES



Even 60 years ago, the *Wall Street Journal* reports, figuring your income taxes could be difficult. FDR wrote to his own commissioner of Internal Revenue, "I am wholly unable to figure out the amount of tax" owed. Then as now, of course, what one owes was subject to political manipulation. "When a friend of the President's was ordered to cough up $420,000 in tax penalties, FDR called the commissioner, in earshot of reporters, and barked: 'Cut it to $3,000.'" And then as now, the press could be counted on to be friendly to the Leviathan's taxing powers: "David Brinkley, among those listening, recalled years later: 'Nobody seemed to think it was news, or very interesting.'"

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delicious, widely available, and low in cost." Writing in the journal *Addictive Behavior*, Brownell and Yale graduate student Katherine Battle contend that the government should subsidize healthy foods and hike taxes on "unhealthy" foods that are high in fat and cholesterol.

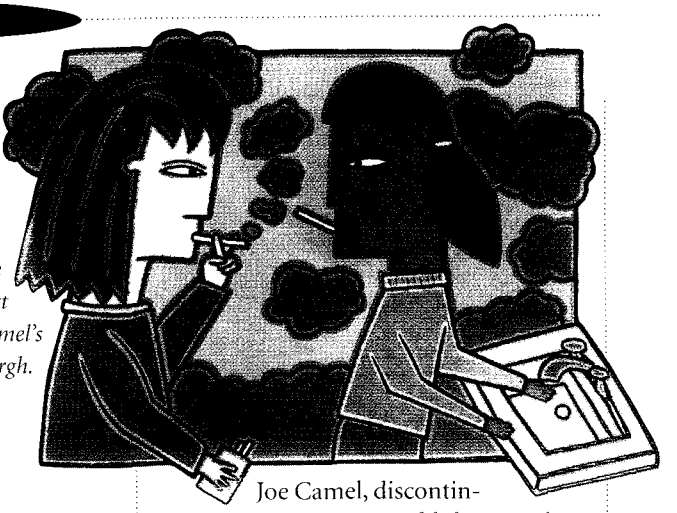
"As a culture, we get upset about Joe Camel," Brownell asserts, "yet we tolerate our children seeing 10,000 commercials a year that promote foods that are every bit as unhealthy." The solution? "Junk foods advertisements should be regulated and excise taxes imposed on high-fat foods," says Brownell, "just as they are on tobacco and alcohol." Joe Camel today, the Pillsbury Doughboy tomorrow.

Taking the lead, Chicago, Washington, D.C., and Maine have levied higher taxes on snacks and soft drinks. Going further, "The Sustainability Plan" in San Francisco, a report prepared for and endorsed by the city government, calls for more "culturally responsive" foods, a "fruit tree in every yard," and "citywide production quotas" for "appropriate crops."

Frank Vandall, the Emory University law professor who egged on Mississippi to file the first lawsuit against tobacco companies and currently has plaintiffs' lawyers licking their chops over a class-action kill against beer and liquor companies, says that he "can't rule out" that America's fast food chains will be the next target. "Look next for charges that the soft-drink industry deliberately manipulates the sugar and fat content of their products in order to hook consumers," says *Investor's Business Daily*.

Unfortunately, as this latest uproar of preaching and central planning begins turning into another regulatory and litigation monstrosity, scientific evidence is taking a back seat to the conventional wisdom about the link between weight and health. Glenn A. Gaesser, professor of exercise physiology at the University of Virginia, for instance, reports that "the lowest death rates are found in the fittest men and women, no matter what they weigh." In fact, Gaesser reports that actuarial studies show "for an average-height woman (5 feet 3 to 5 feet 6) in her fifties, the weight at which she would have the lowest of all mortality rates would be 185-194 pounds." Gaesser's advice? "Exercise more, eat healthier foods, and don't obsess about the numbers on the bathroom scale."

*—**Ralph R. Reiland** is associate professor of economics at Robert Morris College and owner of Amel's Restaurant in Pittsburgh.*



AN ADOLESCENT VIEW OF SMOKING

Whatever its legislative fate, the anti-smoking movement has certainly become a cultural juggernaut. But has anyone stopped to ponder the message it's sending to teenagers?

Cigarettes are dangerous. They're for adults only. Teens are imperiled by their irresistible seductiveness. Authority figures of all kinds—politicians, teachers, editorial pages—agree they're bad.

Why not just come out and say it: Cigarettes are cool.

I was a teenager once, and I remember my teen years as a time of intense rebellion. I didn't smoke; my tastes ran more to fast driving, crank calls, and dopey libertarian opinions. But all teenagers instinctively recoil at being told what to do—a fact that seems to have escaped the notice of anti-smoking zealots. Their heavy-handed moralizing has made cigarette smoking into the ultimate act of adolescent rebellion, at once countercultural and politically incorrect.

Joe Camel, discontinued by R.J. Reynolds last year in the face of a threatened ban, has been transformed from a droll dromedary into an honest-to-goodness outlaw. If RJR really wants to sell cigarettes to teens, it could hardly do better than to run advertisements with the slogan: "Joe Camel is so cool, you're not allowed to see him."

In a recent issue of the *Weekly Standard*, Tucker Carlson describes efforts to enlist schoolchildren in the war against smoking. "At a New Jersey middle school, 13-year-old Jeff Koltys sits in front of a computer working with a desktop-publishing program to superimpose a photograph of a cigarette over a photograph of a tank.... As Jeff explains, the image he is creating has a simple message: 'Smoking kills.' Across the room, Jeff's classmates are working on similar projects. One student has used his computer to create a sinister-looking picture of Darth Vader smoking. Another has designed a grim wedding portrait of a bride and groom standing eye to eye in a graveyard, smoldering cigarettes in their teeth."

One can imagine how such goody-two-shoes propaganda goes over with the tough kids at Jeff's school. Just reading about it, I was so irritated I was tempted to smoke a pack or two—and I'm old enough to know better.

Meanwhile, the *Wall Street Journal* reports that the state of Florida is kicking off an advertising campaign against teen smoking, funded by an $11.3 billion lawsuit settlement. The terms of the settlement bar Florida from attacking tobacco companies directly; so the ads, produced by the Miami agency Crispin Porter Bogusky, target media and marketing industries instead. One ad demands: "How

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about a warning label on movies that glamourize smoking?"

Great idea! While we're at it, how about a warning label on movies that glamorize sex and violence, so teenagers will know not to see them?

Florida is also considering "guerrilla-type crank calls to companies that contribute to smoking," the *Journal* reports. Chuck Porter of Crispin Porter Bogusky suggests enlisting people to call employees of ad agencies that work for tobacco companies. The callers would say things like, "You do the Marlboro ads, and we blame you for that." Surely, if Porter is this juvenile, he knows his ads won't work.

As for the politicians, I don't know if Hillary Clinton, C. Everett Koop, and John McCain were ever teenagers. But Bill Clinton has no excuse, since by all accounts he still is one.

—*James Taranto is deputy features editor of the* Wall Street Journal *editorial page.*

THE GLASS REPUBLIC

We knew it had to be too good to be true. *The New Republic*, a magazine conceived in the "progressive" statism of Herbert Croly, suckled at the breast of warmongering intellectuals who somehow managed to avoid the killing fields of Europe themselves, and raised to adulthood, then old age, believing in every government intervention known to man, had finally hired a witty popper of liberal balloons. Stephen Glass, though steeped in the callow suburban smart-ass tradition that has distinguished the magazine for some years, was a regular laugh riot.

He uncovered "The First Church of George Herbert Walker Christ," a hitherto-unknown coven of Bush-idolators. He mocked feverish environmentalists, the DARE program, even the Americans with Disabilities Act. In his best-known piece, he reported the sordid doings behind closed doors when young conservatives get together. ("In the get-naked room, everyone disrobes immediately, without a hint of embarrassment. One couple fondles each other in the corner. A muscular man, apparently hallucinating, prances around the room like a ballet dancer. A woman locks herself in the bathroom, crying and shouting out the name, 'Samuel.'") Hilarious, sharply observed—and utterly untrue. Glass made it all up. As he made up all or part of 27 of the 41 articles he wrote for *The New Republic.*

The magazine offers its "deepest apologies" for Glass's fictions. The editors, unlike the frolicking conservatives in the get-naked room, are doubtless embarrassed. After a month or two of contrition, they will hire new Glasses, every bit as young, as smug, as inexperienced in the life of America, and as morally lax, if not as talented. There's plenty more where Stephen Glass came from. They wouldn't be at home in the old Republic, but they'll fit right in at *The New Republic.*

RADICALS IN ACADEME

It's premature to predict the death of political correctness on campus, but if you listen carefully you can hear a large crack appearing in the pediment: Historians from the far right to the far left, abandoning the P.C. agendas of their largest scholarly group, the American Historical Association, have launched their own group, the Historical Society. The Society has its own radical agenda: It "will be a place in which significant historical subjects are discussed and debated sharply and frankly in an atmosphere of civility, mutual respect, and common courtesy. All we will require is that participants lay down plausible premises; reason according to the canons of logic; appeal to evidence; and prepare to exchange criticism with those who hold different points of view."

P.C. professors will have a hard time claiming the group is a bunch of right-wingers ignorant of race, gender, and other approved topics. The president is Eugene Genovese, one of the foremost historians of American slavery (indeed, a past president of the American Historical Association), and other founders include his wife, Elizabeth Fox-Genovese, a pioneer in women's studies, and John Womack, a self-described "communist" who teaches at Harvard.

Genovese tells TAE that the response from across the political spectrum has been "far beyond my fondest hopes." He is proud of the "large contingent" from the left "who agree with us" on repudiating P.C. and on "what good history is." His colleague Marc Trachtenberg of the University of Pennsylvania adds, "a few months ago, I thought the establishment of this new group would be little more than a symbolic gesture. I was astonished by the response, and now I am more optimistic."

Someday it may even be safe to send the kids to college again.

"About these experiments you've conducted for twelve years... no one remembers hiring you."

WHEN FEMINISM AND MEDIA BIAS COLLIDE

Nina Burleigh, self-declared feminist and former *Time* White House reporter, made news when she published an essay in *Mirabella* describing how playing cards with Bill Clinton on Air Force One so excited her that she was "quite willing to let myself be ravished by the President, should he have but asked." This led the *Washington Post*'s media critic Howard Kurtz to ask her if she could still objectively cover the President, to which Ms. Burleigh replied, "I would be happy to give him [oral sex] just to thank him for keeping abortion legal. I think American women should be lining up with their presidential kneepads on to show their gratitude for keeping the theocracy off our backs."

We note that, among many other things, this is an admirably clear answer to the question of Ms. Burleigh's objectivity.

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IS MICROSOFT A PREDATOR?

On May 18, the Justice Department filed an antitrust lawsuit against Microsoft, the largest such case since AT&T was broken up in 1984. The American Enterprise Institute held an Amgen Forum to discuss the suit featuring three experts affiliated with AEI. **Robert Bork** is Olin Scholar in Legal Studies at AEI, author of *The Antitrust Paradox*, and also an attorney for Netscape, a Microsoft competitor. **George Priest**, a member of AEI's Council of Academic Advisers, is Olin Professor of Law and Economics at Yale. **Thomas Hazlett**, an adjunct scholar with AEI, is director of the Program in Telecommunications Policy at the University of California, Davis. We reprint here excerpts from the forum.

ROBERT BORK: Unlike my colleagues here, I think the Department of Justice's case against Microsoft is rock-solid. And the controlling precedent is *Lorain Journal* v. *United States.* The *Journal* was a newspaper that, as the Supreme Court put it, enjoyed a substantial monopoly in Lorain of news and advertising. It had a 99 percent coverage of the families in Lorain County. That monopoly was challenged when a radio station opened up and began to take advertising. The *Lorain Journal* responded by saying that anyone who advertised on the radio station could no longer advertise in the newspaper. The Supreme Court held that that was an attempt to monopolize, and there being no economic-efficiency justification apparent, it was a predatory action and hence illegal.

The parallel to the case against Microsoft is exact. Microsoft currently ships 97 percent of all pre-installed P.C. operating systems, and it imposes requirements on customers and suppliers that inhibit their dealings with Microsoft's rivals. Monopoly power exists, according to the law, if a firm has the power to raise prices above the competitive level or to exclude competitors from the market. Microsoft has both forms of power. Its profits are among the highest of any American company's. It also possesses and exerts the power to exclude rivals.

It has integrated its own Web browser, Internet Explorer, into its operating systems, Windows 98 and 95. It will not allow computer manufacturers to remove that browser. Second, it employs a complex web of restrictive agreements designed to block the entry or growth of rivals.

Netscape produced the first Web browser, the Netscape Navigator, and that was a serious threat to Microsoft's dominance of the P.C. operating systems market. Navigator works on numerous operating systems, so that applications developers need not invest the time and expense to rewrite their applications for different systems. A browser with a large number of users can become an alternative platform by, for example, combining with Sun Microsystems' cross-platform language Java, which can run on any operating system. Microsoft recognized the danger at once. An executive wrote that a competing browser could eventually "obsolete Windows."

These were free-market possibilities Microsoft was not prepared to accept. It developed its own browser and integrated that browser with its monopoly operating system, so that computer manufacturers must take both as one package. And it made no extra charge for the browser. That is selling below cost. Microsoft's share of the browser market then skyrocketed, propelled by its operating system monopoly.

Microsoft's licenses for Windows 98 prohibit computer makers from modifying the screen that you first see when you turn on the P.C. That denies diversity to consumers who desire different screens. Microsoft requires its own browser be shown on the screen. This effectively blocks Netscape from the most important means of getting its browser to consumers. True, browsers can be downloaded from the Internet, but the home user of a P.C. is highly unlikely to have the expertise or time to download Navigator from the Internet, which now takes at least two hours.

Microsoft has extracted exclusionary contracts from Internet content providers and independent software vendors. In order for those providers to place their branded icons on the Windows desktop screen, Microsoft requires them to limit the promotion, distribution, and support of competitive browsers. And many of the agreements require that content providers design Web sites that are not accessible by other browsers.

Microsoft has been explicit in internal memoranda about this tactic. An executive, John Ludwig, wrote to Bill Gates: "We have seen very little adoption of our technology, though. Finally, with Internet Explorer Number Four, we have our top tier of content partners using the technology, because we forced them to in our contracts with them."

The government does not challenge Microsoft's monopoly size or its business success. Size gained by superior efficiencies and products, or even just plain luck, is completely lawful. The essence of the case is that Microsoft has a monopoly in principal computing systems, maintains that dominance with an interlocking pattern of exclusionary contracts and practices, has admitted as much in its own internal documents, and unless stopped, will continue to maintain its personal computer operating system monopoly illegally, while spreading its power to other markets, which it is doing now.

GEORGE PRIEST: I'm relying entirely on the ideas that Bob Bork published in *The Antitrust Paradox* 20 years ago. I believe this is a very dangerous case.

Computer software is today the most vital industry to economic growth in the United States and around the world. This is not a reason to relax the anti-trust laws, but it is a reason to proceed with an anti-trust prosecution only if we're absolutely certain that what we're doing will aid consumers and the economy.

No one can claim he knows what this industry will look like in ten years, five years, or even two years. There is totally free entry. Software developers may write any program they can imagine. They can define the product any way that they want, which is to say any way consumers want. The only true barriers faced by Microsoft's competitors are barriers created by Microsoft's effectiveness. Consumers like and want Windows.

This industry is not like manufacturing industries from which most of our

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antitrust experience derives, where a large market share suggests power because it takes so many decades to erode away. Here we can't even be confident we know how to define the product. Does the basic product include a browser or not? Bob treats the browser as if it's a second product, but there is no unambiguous answer to that question.

The Justice Department claims it's monopolistic and predatory for Microsoft to insist that the first screen booted be Windows. But this can't be the source of Microsoft's market power, nor can it add in any way to it. Manufacturers are allowed to add to the Windows screen. There's a vast area on the screen where other icons and other programs can be added, including Netscape Navigator. My computer, for example, has Navigator on its initial screen. And anyone can easily change the first screen, change the prominence of one set of icons or another, add other icons, etc.

The Justice Department wants Microsoft to install Netscape's Navigator browser instead of its own Internet Explorer. But if Internet Explorer is more effective than Navigator as a browser, then what the Justice Department wants will hurt consumers. If Internet Explorer, on the other hand, is less effective than Navigator, then the Justice Department would be increasing Microsoft's market advantage.

Bob emphasizes the downloading problem, but during those two hours or seven hours no one is forced to be breaking rocks. You flip a switch, hit a few keys, and go do something else. It cannot be a serious barrier to competition.

Bob has mentioned various complaints about promotional activities of Microsoft, such as giving away Internet Explorer free. But if our ultimate value is to benefit consumers, what could be better than to have the browser provided free? Bob claims this is predatory pricing, but there's good reason to believe the appropriate price is zero, or even negative, because it's virtually costless to reproduce the program.

The best evidence that this is a weak case is that we cannot think of an antitrust remedy that will solve the problem. In the context of, say, Standard Oil or AT&T, one can break up the company into regional operating companies, or one can separate the regulated from the unregulated subsidiaries within the company. There's no thought that we could do that with Microsoft.

Mandating the inclusion of Netscape Navigator in Windows will not fundamentally change the direction of the software industry in favor of consumers. Why Navigator as opposed to some other browser? Why just a browser? Why not other auxiliary programs as well? Should we mandate competing Web TV sites, mandate e-mail, mandate other applications that today are only dreams? We really have no answer to any of these questions.

THOMAS HAZLETT: The government is concerned about Microsoft pricing products at zero, which they think is too low. But consumers are not hurting from the competition. They're benefiting with low prices, expanded output, and a tremendous enhancement of quality.

QUESTION: As a long time Mac aficionado, I am horrified to live in a world in which competition is defined as the competition among Windows 3.1, Windows 95, and Windows 98. Microsoft can at any moment, using their position, price their commodities at zero with the express intent of removing a competitor. Isn't this the sort of problem the Sherman Antitrust Act is supposed to protect against?

HAZLETT: The purpose of the Sherman Antitrust Act, if you read *The Antitrust Paradox,* is to protect consumers. And if prices go down, that's good for consumers; if prices go up, that's bad for consumers, Microsoft has introduced a lot of products that have not done well. Read what the Department of Justice was worried about Microsoft's using its monopoly to take over in 1994. The big scare was Microsoft Network, MSN. Remember that monopoly?

Supposedly, we have to protect Netscape because it's got Java, and the two of them are 75 percent of the way to providing an alternative to Windows. How did they get 75 percent there? How did they get on so many millions of machines? How come I've got Java on my machine every time I boot up? Because of the open standards that Microsoft has pursued.

You're from the Apple world. Well, Apple fought its battle exactly the way Microsoft is being characterized by the Justice Department as fighting the battle. Apple said, We've got a nifty product, we've got a lock-in, our customers are stupid. They're not going to go anywhere. They love us, and we'll just jack prices up and take big cash flows. And this little company called Microsoft said, No, it's market share, we'll give stuff away, we'll do anything we can.

CRUISING WITH THE ACLU

Cruisingforsex.com is a Web site dedicated to assisting homosexuals find locations for anonymous public sex, such as restrooms or parks. At the site, as of June 8, 1998, the Family Research Council found "THIS NOTE FROM THE ACLU: We have become concerned about the recent increase in police harassment of gay men in public parks in Norfolk. We are interested in finding potential clients in order to challenge this growing harassment. If you have been arrested in a park or other public place in Norfolk, the American Civil Liberties Union may be able to assist you. Please contact Mary Bauer at the ACLU of Virginia at 804-644-8080."

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PLEASE LET UP

Recently, Oklahoma at-home mother Susie Dutcher testified before members of the U.S. Senate Finance Committee on the subject of child care:

Mr. Chairman, I want to thank you for inviting me here today. I believe that politics and policy are important, and I respect your public service. I believe families are equally important, and I hope you respect my public service, which consists of providing the public with one healthy family, composed of well-adjusted, productive individuals.

I spend my days cooking for my husband and children, doing laundry, cleaning toilets, and vacuuming. I teach my children to read and do math, and I take them to the park. We do watercolors and science experiments, and I read them Aesop's fables and David and Goliath. I probably spend two hours a day in the rocking chair. After they're all tucked in bed, I fold the laundry and do the family budget on our computer. Believe it or not, I don't play golf or go to the club and play cards.

This is the life I've chosen because I believe it's best for children, whenever possible, to be cared for by their mother rather than by strangers. I believe my job is important. And because of the time and money and energy I invest in their lives, I believe my children will grow up to do great things. I believe none of them will end up on the welfare rolls, in prison, or in any way dependent upon the state.

I used to be a schoolteacher, and certainly the salary and benefits I could earn teaching school would improve our material well-being. But some checks can't be cashed at the bank: My son Lincoln, when he was three years old, said to me one day, "I'm proud of you 'cause you do the right things. Like take a shower, and fix my breakfast—those kind of things." I know it's all worth it when we're on the floor playing with blocks, and I notice out of the corner of my eye that he's stopped playing and is staring at me like a smitten young man. There's no need for me to rattle off the social-science research on the importance of strong marriages and families; some truths are self-evident.

I mentioned I do the family bookkeeping, and I can tell you that taxes are far and away the biggest portion of our family budget. There are many things I would like to do with my husband's earnings, but, with all due respect to your honorables in both parties, you seem to believe you have the moral authority and the superior judgment to make those choices for us. I would love to put more dollars into our retirement account, for example, but I'm forced to put them into your Social Security trust fund, which I don't trust. I'd like to buy more books for Lincoln, Elizabeth, and Mary Margaret, and put more money in their college fund, but you've already seen fit to use that money funding closed-captioning for the Jerry Springer show. I'd love to get ballet lessons for Elizabeth, but my money is tied up buying food stamps for the deceased. I'd love to give more money to support our church's missionary in Albania, or the free medical clinic in Oklahoma City, but instead I'm forced to fund fish farming in Arkansas and Social Security disability payments for escaped convicts. Call us greedy, but my husband and I would like for the most part to make our own choices concerning the fruit of our labor. But naturally, under threat of imprisonment, we defer to your choices.

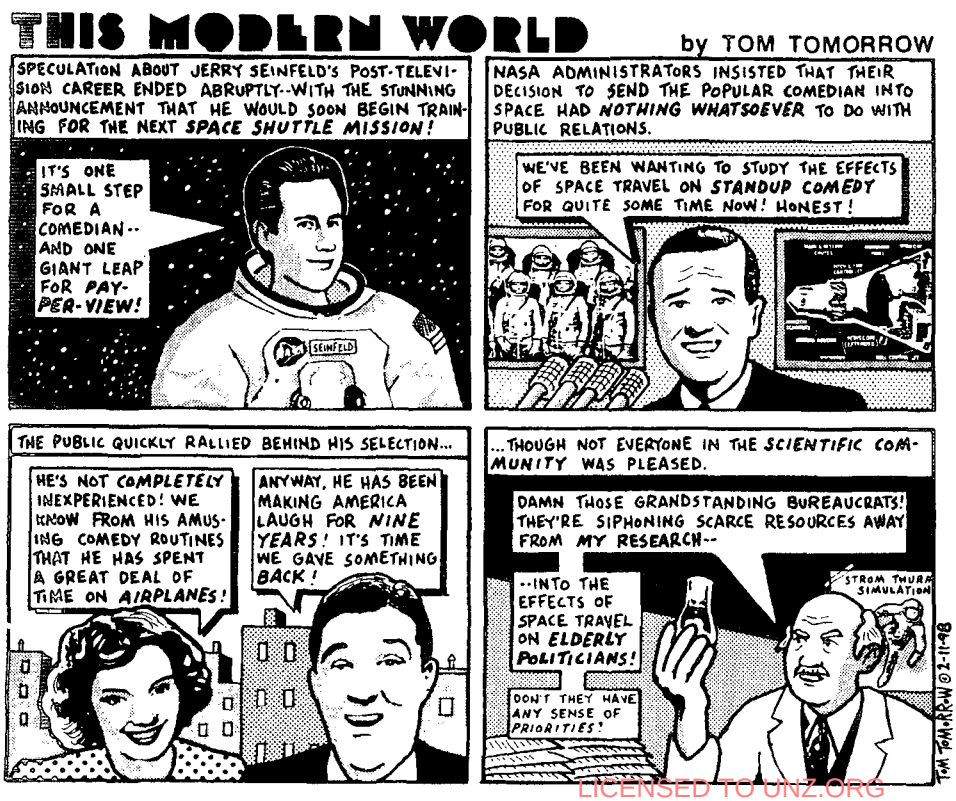
I appreciate the opportunity to testify today, because your decisions deeply affect my family. I can't tell you how frustrated we are that, under budget agreements passed by Congress, federal revenue collections are set to rise from $1.35 trillion in 1995 to $1.9 trillion in 2002. That's why my husband took two vacation days (out of the 10 he gets each year), and why we traveled here at our own expense, which amounts to more than a week's salary to ask you to let up.

I'm so glad I can be at home for my children, and I implore you not to craft public policies which discourage mothers from doing so. My husband and I certainly don't want to pay the day-care bills of two-income couples more affluent than ourselves.

All we ask from you is to safeguard our family's liberty and property, and to stop taking them.

CRYSTAL MAGIC

Britain's *Daily Mail* recently pictured the Prime Minister's wife wearing a "bioelectric" pendant. The product's inventor, chiropractor Charles Brown, told the *Mail* it "contains a 'magical configuration' of quartz and other crystals which deflect electromagnetic radiation from modern office equipment—and counter 'negative vibes.'" A representative from the Bioelectrical Shield Company told the paper "he believed that Mrs. Blair had decided to buy one after a recommendation from Hillary Clinton."



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By David Murray and Tom Riley

Indicators

Special Edition on Science and Politics

POLLUTED SCIENCE

If you want to win an argument in Washington, turn to the laboratory not the lobbyist. How often have we seen this progression: A scientific body will convene a panel to assess a research area. The panel will likely be divided, evaluating evidence of varying quality. A statement will be issued, something on the order of, "While no study is itself fully convincing, a pattern of evidence suggests that so and so is not unreasonable."

Soon, the qualifiers begin to drop out of the statement, and interested parties start to declare, "A preponderance of evidence now demonstrates that so and so." By the time this science is deployed by a policy maker to justify a decision, all tentativeness will have disappeared, and the media will be told, "A substantial body of meticulous science has *proven* that so does in fact mean so."

For example, when **Environmental Protection Agency Administrator Carol Browner proposed new regulations on air quality last summer,** she found herself in an intense political fight. **The costs of the regulations would be considerable, while the health benefits were dubious.** Suddenly Browner's case was strengthened by a study headed by EPA scientist Tracey Woodruff. The research led to some alarming headlines: "Panel Links SIDS, Air Pollution; Doctors Blame 500 Deaths a Year on Particulates" (*Baltimore Sun*).

The study found that death rates for Sudden Infant Death Syndrome (SIDS) were as much as 26 percent higher in areas with high air pollution than in areas with low air pollution. According to the EPA's Environmental Working Group, this means over 500 infants a year die because air pollution isn't more stringently regulated.

But how good was this science? First, the study contained a major oddity: Infants with low birth weight, who are most vulnerable to air pollutants, showed no statistically significant increase in risk. Yet according to a definitive, case-control study of SIDS in the *British Medical Journal*, low birth weight is strongly correlated with death, increasing the risk by 380 percent.

Other risk factors also swamped the 26 percent risk attributed to pollution by Woodruff:

Risk factors for SIDS

Living in a high-pollution area	+26%
Being male	+84
Sleeping on an old mattress	+250
Having an unmarried mother	+422
Having a school dropout mother	+428
Being born prematurely	+450
Being in poverty	+960

Sources: Environmental Protection Agency, *British Medical Journal.*

Further, SIDS **deaths decreased nearly a third overall after doctors began recommending that infants sleep on their backs.** Finally, according to new research just published in the *New England Journal of Medicine,* **infants having a certain congenital heart condition face an astonishing 4,100 percent increased risk of** SIDS (the condition accounted for half of the SIDS deaths in the study of 34,000 infants).

In short, the Woodruff study that was treated as compelling evidence by an EPA Administrator ignored a host of confounding factors and misleadingly suggested air pollution was a critical variable in SIDS.

SCIENCE MADE ME DO IT

Politicians like to invoke science so as to escape accountability for their decisions: Science made me do it.

Yet whenever politicians and lab-coated oracles merge, two problems arise from the different principles that govern the realms of policy and science. First, **policy decisions demand closure and certainty, but science is by its nature cautious, contingent, and corrigible.** Evidence is rarely indisputable, hypotheses must bend to new facts, and definitive consensus is nearly impossible to forge. As former *Nature* editor Sir John Maddox once wrote, consensus is inherently a political, not a scientific, act.

A second problem is that science is inductive and proceeds by an incremental interrogation of nature in which, ideally, the data are the ultimate determiner. Policy fights, however, are more like courtroom litigation. Disputants will urge one another to "just look at the evidence," but each party acts as either a defense counsel or a prosecutor, reading the science selectively in order to establish the best case for their respective clients.

A recent example of this failure to consider all relevant data involved this year's enrollment for the University of California system after the banning of racial discrimination by Proposition 209. Critics of the ban predicted enormous drops in minority enrollment. So when this year's statistics were published, they filled the headlines: "Figures released by all eight undergraduate campuses yesterday show that the number of black students who plan to attend U.C. in the fall has dropped by 24 percent and the number of Latinos by 6 percent," the *San Francisco Chronicle* trumpeted.

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But those figures were based on incomplete data, because **the number of incoming students who declined to state their ethnicity soared by over 300 percent, from 1,233 to 3,863.** Thus, there is only one thing we can be statistically certain of: **We simply do not know what the exact ethnic enrollment changes are.**

Berkeley professor Neil Gilbert, however, made a fascinating calculation. Based on the record of students in previous years who declined to state their ethnicity, he estimated the actual changes between 1997 and 1998:

Estimated freshman enrollment in the University of California system

	1997	1998
Latinos	13.6%	13.6%
African Americans	4.0	3.2
Whites	43.2	41.1
Asians	38.3	41.2
American Indians	0.8	0.8

Source: Calculations by professor Neil Gilbert, University of California, Berkeley.

So, **the representation of Latinos probably did not fall by 6 percent but remained constant; representation of African Americans probably did not fall by 24 percent, but by 20 percent (or 0.8 percent in absolute terms). Representation of white students likely fell by 5 percent, that of Asian Americans likely increased 7 percent.**

SCIENTIFIC DRUG USE

Recently, controversy has raged over the idea of the government's giving intravenous drug users free needles in exchange for their used ones. At first, Clinton's AIDS czar, Sandra Thurman, solemnly intoned, "We need to let science drive the issue." Soon, Health and Human Services Secretary Donna Shalala announced, "A meticulous scientific review has now proven that needle-exchange programs can reduce transmission of HIV [the virus believed to cause AIDS] and save lives without losing ground on the battle against illegal drugs."

Even the editors of *Science* chimed in: "AIDS prevention is only the latest example of scientifically compelling evidence ignored in favor of political expediency.... Study after study has shown that needle-exchange programs will reduce the incidence of AIDS, a fact acknowledged by the Clinton administration."

Actually, most studies to date suffer from serious methodological limitations. More recent and more carefully designed studies in Montreal and Vancouver reveal that free needle programs may be gravely counterproductive. The Montreal study found persons in needle-exchange programs have a substantially *higher* risk of HIV infection than other IV drug addicts.

What do the data show? A mixed result—a 1995 New Haven study claimed that "Incidence of HIV infection among needle-exchange participants was estimated to have decreased by 33 percent as a result of the needle-exchange program." But in 1997, **an *American Journal of Epidemiology* report found that IV addicts in needle-exchange programs were more than twice as likely to acquire HIV than other IV addicts.** In general, the better designed the study is, the less convincing the evidence that clean-needle giveaways protect against HIV.

WHERE'S THE BEEF?

A July 1995 press conference held by Safe Tables Our Priority and other advocacy groups claimed that *E. coli* bacteria was present in 3.5 percent of ground beef. The groups brought ground meat and invited lawmakers to play hamburger roulette.

But according to the *Federal Register*, a Department of Agriculture benchmark study on raw beef found the prevalence of *E. coli* was 0.1 percent, "while the Nationwide Microbiological Data Collection Program's examination of steer and heifer carcasses showed 0.2 percent." So **the press conference overstated the presence of *E. coli* as much as 35 times.**

The most commonly stated estimates for rates of illness and death are 20,000 *E. coli* contaminations per year and 500 deaths per year. But qualifications must be attached to these estimates. The principal scientific source for the incidence of infection is a 1991 article in *Epidemiologic Review.* This study is the original citation for all subsequent estimates in news articles and press releases, even though it does not contain the figures claimed for it. The three studies it reviews are based on population screening. The rates of infection range from a low of 2 per 100,000 to a high of 8 per 100,000, with an intermediary finding of five per 100,000. These three rates, projected upon a U.S. population of 260 million, produce estimates of 5,460 infections, 20,800 infections, and 13,500 infections. But what of deaths?

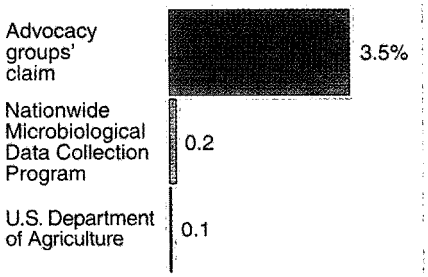
Most cases of infection result in no fever and resolve themselves in 5 to 10 days. The most serious development is hemolytic uremic syndrome (HUS), occurring in 2 to 7 percent of infections. Of those who develop HUS, 3 to 5 percent will die. Running these numbers out, **a low of 3 persons per year could be estimated to die, while the high end estimate would yield 73 persons per year.**

This is not good, but it is not 500 deaths a year, either. So claims made in congressional debate over regulatory reform turn out to be erroneous by a factor of either seven or 167 times.

In short, when a politico tries to sell you some science, examine the goods carefully before you buy.

—David Murray is director of research and Tom Riley is senior analyst at the Statistical Assessment Service.

Prevalence of *E. Coli* bacteria in raw beef



Sources: Safe Tables Our Priority, Nationwide Microbiological Data Collection Program, U.S. Department of Agriculture.

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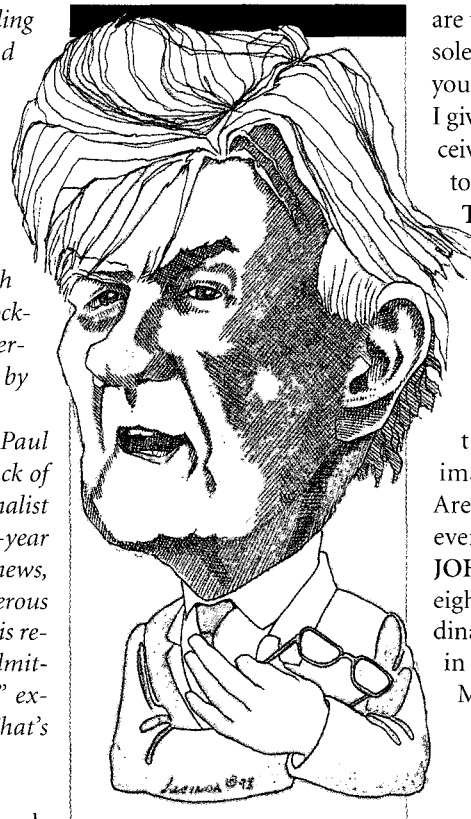
THE MAN WHO CHRONICLED MODERN TIMES AND OTHER EPOCHS AND PEOPLES SOUNDS OFF ON WITCH-BURNING, BILL CLINTON, AND HIS FAMOUSLY FAT BOOKS.

Paul Johnson

Paul Johnson is the most prolific and best-selling historian of our era. An English Catholic and former editor of the left-wing New Statesman, *Johnson's latest book—and perhaps his most controversial—is* A History of the American People. *It is every bit as long as previous weighty Johnson works* (Modern Times, A History of the Jews, The Birth of the Modern) *and filled with admiring portraits of such unlikely heroes as Richard Nixon, Norman Rockwell, and the robber barons. Johnson was interviewed at the American Enterprise Institute by* TAE*'s Bill Kauffman and Walter Montano.*

Postscript: *Shortly after this interview, Paul Johnson's name was dragged through the muck of Fleet Street when a 50-year-old female journalist went public with the kinky details of their 11-year sexual affair. The British press reveled in the news, for Johnson had repeatedly denounced adulterous politicians.* TAE *was unable to reach him for his reaction, but the English papers quoted him admitting to "having an affair with an old girl," explaining, "We are all sinners. Well, I am. That's why I go to church every day."*



I don't think JFK's way of life was sustainable, and I think the conspiracy to protect him would not have endured very much longer.

TAE: Do you worry that the heft of your volumes deters potential readers?

JOHNSON: It must. If anyone can tell me how to write books more shortly on huge subjects like that, I will listen with open ears. I was determined that this particular book should not be more than a thousand pages, and I honestly do not think that it could have been written in less. There's no fat on this book; it's all lean meat.

TAE: What advantages and disadvantages does a foreigner have in writing a history of another people?

JOHNSON: You don't have hang-ups. You don't have axes to grind. You have a certain freshness and perspective. Tocqueville, for instance, was able to see things which were true and obvious, or you'd think were obvious to everyone's eyes, but Americans themselves hadn't spotted because they were too near to it. The disadvantages are you're liable to make mistakes, slips, and silly solecisms. In my preface, I say if there's anything you think is wrong in this book, write to me, and I give my home address. I've already begun to receive letters. Americans are not slow to respond to every kind of invitation.

TAE: How can you write a history of the American people and never mention baseball?

JOHNSON: I just forgot. I was going to put it in. I can assure you, cross my heart, that by the time the next edition comes out, if it ever does, there will be baseball.

TAE: Schoolchildren learn American history as dates—1492, 1776—and mythical images—Pocahontas, the Boston Tea Party. Are there any overlooked dates or images that every schoolchild should memorize?

JOHNSON: It's a pity that the seventeenth and eighteenth centuries are not better known to ordinary Americans. There's an awful lot going on in those early colonies, like Pennsylvania and Maryland, which are not sufficiently known to Americans generally. Another thing I would like to see revised is the robber baron period. In the book, I endeavor to show that with one or two notorious exceptions, these were not robber barons. They were highly successful, highly intelligent businessmen who were anxious to make a lot of money for themselves but who were also anxious to benefit the American people by making goods which were luxuries into necessities, by bringing new products before the market or by reducing the cost of things that ordinary people needed, like sewing machines. Even in the case of John D. Rockefeller, who was denounced by the muckrakers, the net effect of the temporary quasi-monopoly he created was to reduce the cost of production of oil and its byproducts, particularly petroleum. Oil was one wing of the triptych, the other two being motor cars and rubber, which enabled ordinary Americans in the first two decades of the twentieth century to become owners of motor cars. For the first time in history, or-

Illustration by Lucinda S. Levine

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dinary people became masters of their own transport and could really get around. The benefits of that revolution were absolutely colossal, and the way that the epoch between 1870 and the First World War is treated in American textbooks and in the general American consciousness does not do justice to these great entrepreneurs.

TAE: The robber barons seemed much larger than the politicians of their age. Are we seeing the same thing today, with the exaltation of people like Bill Gates or Ted Turner?

JOHNSON: I doubt it. Bill Gates doesn't strike me. I saw him not long ago in one of the Italian lakes. A funny little man got out of a boat and came up the hotel steps and into the hotel. I said, "Who's that?" and somebody said, "That's Bill Gates." When you get a really great man, like the present Pope, when he comes into a room he fills it. You're aware that there's this big presence.

TAE: Which figures in our history never got enough recognition?

JOHNSON: There are two types. There is the kind of President who is not sufficiently recognized as a great man. My favorite is Theodore Roosevelt. You may say, well, he's already well-known, but I think he's due for a notch-up. Another favorite of mine is Calvin Coolidge. His reputation was absolutely destroyed in the 1930s by a lot of dubious quasi-history. I regard him as one of the best Presidents, and I can't think of any man whose life would give to ordinary Americans more useful lessons than Calvin Coolidge. He was a depository of many very important virtues, which are perhaps not sufficiently prominent today.

TAE: The Presidents judged "great" in these polls are almost invariably the war-makers and state-builders, are they not?

JOHNSON: Yes. It's difficult to say what is the most important thing a President should do. Obviously, he has to lead, particularly in wartime and great crises, like the Depression. But he has to do other things. He has to be representative. He has to be ordinary man writ large. Curiously enough, Warren Harding scored high on that: he was in many ways an ordinary American. He used to take a horse ride around Washington every Sunday. And people would see him in the streets, they'd raise their hats to him, and he would bow or raise his hat. He'd complete his circuit and go back to the White House. I think he was the last President who occasionally answered the door of the White House himself. There was a butler there, but sometimes the door would ring, he'd open it, and the chap would find the President there. He'd ask him in and say, "What have you got to say? What are you doing in Washington?" He was very nice. That kind of domestic presidency, the intimate presidency, just can't exist anymore, but it did exist and not all that long ago either.

I can't think of any man whose life would give ordinary Americans more useful lessons than Calvin Coolidge. He was a depository of many important virtues which are perhaps not sufficiently prominent today.

TAE: Why do you suppose the quality of men in public life has declined so dramatically? From Washington, Franklin, and Jefferson to Bill Clinton and Trent Lott is a fall into the abyss, isn't it?

JOHNSON: I don't agree with that. There were a lot of mediocre Presidents in the nineteenth century. Between Lincoln and Theodore Roosevelt, with the possible exception of Grover Cleveland, they were not a very impressive lot. In my lifetime, you've had some very good Presidents: Harry Truman, Dwight Eisenhower. Although the presidencies of Lyndon Johnson and Richard Nixon ended in failure, both of those men had elements of greatness in their characters. Jerry Ford didn't have much of a chance. Jimmy Carter was a great disappointment, though even he did one great thing, the Camp David agreement between Egypt and Israel. To achieve one really important thing in a four-year term is not all bad.

In 1980, the reputation of the presidency was very low indeed, and Ronald Reagan came in and almost immediately began to raise it. He brought back the ceremony of the presidency, which had been deliberately or tacitly abandoned in the '70s as the presidency fell into disrepute. That had an enormous psychological effect, not merely on the people within the White House, who felt once more that they were part of the great governmental institution, but among the ordinary public. The great thing about the United States presidency is it's an institution with a life of its own and it can survive fallow years. It is always there waiting for a great man or woman to occupy it and raise it to the heights again.

TAE: The Civil War has been called the single tragic event that continues to give our republic resonance. Others now dismiss it as remote and irrelevant. Which is it?

JOHNSON: I call it the central event in American history. It was the means whereby the organic sin of slavery was exorcised and expiated. It was also the means whereby the unity of the United States was confirmed in the most emphatic manner. Thirdly, it was a way in which America, which before had been a republic, became a nation. It's interesting that the word *nation* is very little used by the Founding Fathers; in fact, some of them actually objected to it. When people say it's irrelevant, they can't have studied it.

TAE: Was the war inevitable: the logical climax of the story that began at Plymouth and Jamestown?

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JOHNSON: The avoidance of it became increasingly unlikely. But if you look at the voting by states, you could argue that if all the slave states had come out for secession, the Civil War would not have taken place because the North would have had to abandon as impossible the policy of coercing them. If fewer of the slave states had come out for secession, then the rebellion would have collapsed very quickly. But a sufficient number came out—this is the awfulness of history—to make the Civil War and make it continue for a long time.

TAE: Three hundred eighty years after John Rolfe's experiments with Virginia tobacco, we're witnessing the redemonization of the weed. What do you make of the current war on smoking?

JOHNSON: You're going back to James the First, aren't you? He hated tobacco. He coined the phrase "the weed," and he wrote a book about it. He hated his American colonists producing tobacco and sending it to England. Then he discovered that he could tax it at five percent and that made it acceptable. Tobacco was the only thing that Americans could produce that anybody in Europe wanted. They could produce economically and in bulk. It is arguable that without tobacco, either the American colonies would not have survived or they would not have expanded and populated themselves so quickly.

TAE: Are we seeing with tobacco another spasm of witch-burning?

JOHNSON: There's always that tendency in America. You can point to European examples, too: we had a witch-burning craze, we had the anti-Catholic riots, but everything in America is bigger. One of the interesting things I've found in examining what actually happened at Salem is that the way in which these children were encouraged by their elders to invent stories is awfully similar to what is now called "recovered memory" among children who say they were subjected to child abuse. If Arthur Miller were rewriting *The Crucible* today, he would be tempted to draw the parallels not between Salem and McCarthyism but between Salem and child abuse.

TAE: After you get to 1941 in your book, America claims less and less of the text and foreign affairs take over. Does America become less American, less interesting, after 1941?

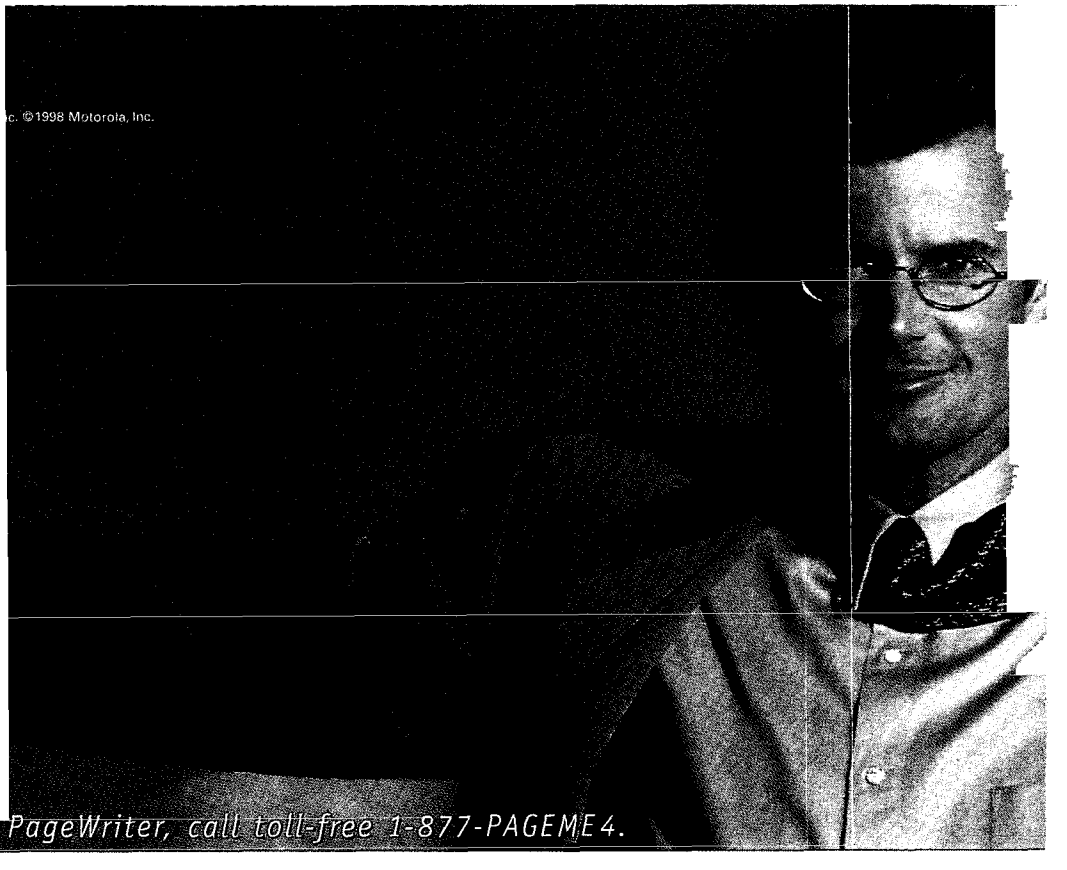
JOHNSON: It's hard to say that. America was never an isolationist country, and what happened in the 1930s was very much an aberration. The internationalist tradition of America is much older and deeper.

TAE: But among the people there was a strong desire to stay out of European wars.

JOHNSON: The people were protected by two great oceans, and they were there with a huge job to do on the American continent. The outside world impinged very little on their lives. Gradually that has changed. You are not protected by the oceans: you have to move about and interest yourself in the world. I don't think it's made America a less interesting country. It's made it a country which is not any longer imprisoned in an amber of its own but which is exposed to all kinds of influences. It's also made it a country which itself is exerting huge influence on the world.

TAE: Is Clinton's second term, mired in sexual scandal, what JFK's second term would have looked like?

JOHNSON: My reading of the medical evidence is that JFK might not have lasted very long anyway. Kennedy would have



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run into all kinds of trouble, quite apart from the medical side. I don't think that his way of life was sustainable, and I think the conspiracy, if you would like to call it that, to protect him, would not have endured very much longer. Some of these things would have come to light even in his own time. But it's more likely that his medical condition would have deteriorated, and he might not even have run for a second term.

TAE: Has a less moral man ever occupied the Oval Office?

JOHNSON: Jack Kennedy did have a moral background. He was brought up as a traditional Irish-American Catholic; so he knew the difference between right and wrong. He may not have thought that those things applied to himself. If you are looking for someone who had no moral background, Mr. Clinton is much more the case because he never displays any evidence that he thinks seriously about spiritual matters or ethical points.

TAE: You write that one thing that drove English visitors crazy about Americans was our habit of spitting. Does that bother you?

JOHNSON: I suppose there is a certain amount of it in the South, but I've never really noticed it. Portugal was the worst spitting country I'd ever come across. What did strike me when I first came to the United States a half a century ago was in New York you saw working men in overalls smoking enormous cigars. I remember walking down Fifth Avenue, seeing a Catholic priest with a biretta smoking a big cigar, and I thought, my, this is a different country. You wouldn't see that at all in England. Of course, you don't see it in America now. That's stopped. So there you are. That's one case of American exceptionalism which hasn't endured.

TAE: Some believe the liberal/conservative division no longer makes sense and may be replaced by a globalist/nationalist split. Are we seeing that in England, with the rise of the Eurosceptics?

JOHNSON: Definitely. The old two-party structure in Britain is out of date. The Left have accepted the capitalist system and the market, sound finance and reasonably low taxation. So there isn't all that much to argue about, but there is a lot to argue about in our relationship to Europe. Therefore, I suspect we will see the evolution of the national party and a pro-Europe party. The traditional parties will split and rearrange themselves around the new dichotomy.

TAE: Do you see the same dichotomy in this country?

JOHNSON: The traditional party system is pretty strong because it's so flexible. It's almost amorphous. When you attack it, it's like attacking a sandbag. So I would say the traditional party system here has more of a future than it does in England.

TAE: When all is said and done, does history treat its subjects fairly?

JOHNSON: I'd like to think that over the long term, history does justice to individuals, countries, and events. But take Warren Harding, dead almost 80 years and only beginning to get a bit of justice. There are probably quite a lot of other figures that have not had justice done to them, but for the big figures I think justice is nearly always done.The mills of justice grind slowly but they do grind exceeding small and sure in the end, and that's encouraged me to go on being a historian.

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Cities

NEED LEADERS ...AND BUSINESSMEN ARE INDISPENSABLE

BY JOEL KOTKIN ⚜ When entrepreneur Richard Riordan became Mayor of Los Angeles in 1993, he confronted a city still smoldering from the previous year's riots. Yet the Mayor saw the collapse of Los Angeles's business elite as perhaps his greatest long-term problem. Large firms were leaving the city, and those that remained increasingly believed L.A. was becoming, as one top Disney executive put it, "a third world" country. ⚜ "As things were changing, and getting worse, the CEOs in L.A. lost their power and their commitment," the 66-year-old Riordan recalled as we walked around his lush Brentwood neighborhood. "When the older guys gave up, there was no leadership, no strong group who considered commitment to the city and philanthropy important."

Los Angeles, a community whose old elites had brought forth a mega-city on semi-desert land now seemed leaderless. Nothing so epitomized the vast power vacuum as a series of projects—once touted by the civic leadership—that stood underfinanced, unapproved, or in limbo. They included the proposed $200 million Disney Hall, a new cathedral, a downtown sports arena, and the Alameda Corridor, a cargo transportation link between the central warehouse district and the nation's largest port.

Five years later all those projects are either essentially funded or under construction. To revive Disney Hall, hundreds of millions of dollars in private contributions have been committed, not only from the usually diffident Disney Corporation but also from powerful new players such as SunAmerica's Eli Broad, shopping center magnate Ron Burckle, and the Times-Mirror Corporation. Most of these donors were cajoled by the Mayor himself.

"You have to have a core of people who enjoy power and exercising it," explained Riordan, a native of Flushing, Queens. "Back in the '50s it was a Committee of 25. They had the ability to make things move. Now we're showing people again that being committed to the city and to charity is a good thing. We are trying to lead by example."

Raising the issue of leadership may disquiet some members of the business community. The radical sociologist C. Wright Mills once observed, "American men of power tend to deny, by convention, they are powerful." Attempting to exercise local leadership can be particularly troublesome in these radically egalitarian, highly litigious times. It seems easier to lose oneself in the daily running of a business or to speechify on a national stage than to work to better a particular neighborhood or region.

Yet a region's business leadership must play an important role, or that region will face long-term decline. "A business aristocracy that hoards its own privileges at the expense of the exercise of power marks the decline of modern liberal democracy in the West," argues sociologist E. Digby Baltzell. This doesn't mean business should dominate all decision-making, but one fact is inescapable: Engaged commercial elites are inevitably the prime drivers behind economic growth and wealth creation.

Ever since villagers herded into something that resembled a city, this pattern has held true. In his classic work, *A Study of History,* Arnold Toynbee attributes the development of successful societies, and cities, to the ability of their ruling elites to meet current challenges and anticipate future ones. "All growth originates with creative individuals or small minorities of individuals," he declared, suggesting that it was the elites, not the masses, who were critical in helping societies to meet new challenges.

In ancient Athens, Aristotle compared citizens' personal interest in the community to that of sailors seeking to bring their ship safely to port. When this strong sense of civic commitment—based on family, religion, and tradition—collapsed in the Greek city-states in the last centuries before Christ, those city-states ended up collapsing. Then came the rise of Rome, greatest of the city-states, which later also collapsed when the rich no longer sought to lead society but contented themselves instead with personal enrichment while shirking public responsibilities.

Likewise in America, entrepreneurs paced the development of our early trading cities—Boston, New York, Philadelphia, Savannah, Baltimore, Charleston—and also played a critical role in the Revolution. In nineteenth-century America, urban centers flourished along with business elites who developed civic projects reflecting both their own ascendancy and that of their cities; these projects included New York's Central Park and Columbia University. Although a huge gap separated New York's ruling circles from the vast majority of that city's residents in the nineteenth century, many projects promoted by the elites—such as the

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"YOU HAVE TO HAVE A CORE OF PEOPLE WHO ENJOY POWER AND EXERCISING IT," SAYS L. A. MAYOR RICHARD RIORDAN.

Croton water system, completed in 1842, the paving of Broadway, and the new sewer and police systems—improved the lives of the working and middle classes.

Ultimately, American urban elites lost their political power after the electorate was reshaped by massive waves of immigrants, mostly Irish, German, and later Italian. Unable to keep political control, New York's "bluebloods" forged a tacit alliance with the immigrant-dominated Tammany Hall—an alliance that persisted into the late 1950s. It survived, says Ed Costikiyan, a former Tammany Hall leader, because the powerful men who dominated New York—Rockefellers, Vanderbilts, Fricks, Morgans—sought to erect private monuments to their economic power rather than construct great public buildings. "For the most part business didn't care about the governance of the city," explains Costikiyan, now a well-regarded lawyer. "They didn't care much who was Mayor. If they really wanted something, they'd just ask for it, but that was about it."

Costikiyan traces the current decline of civic elites in larger cities to the 1930s and the rise of the federal bureaucracy. Reliance on local economies and local wealth generation began to be supplanted by a growing dependence on federal monies. At the same time, the increasing importance of national affiliations in the postwar era eroded local affinities. When elites sent their children away to schools favored by their counterparts across the country, connection to the local community weakened. For example, elite Philadelphians, Baltzell suggests, grew increasingly attached to their class rather than their city, with disastrous consequences for the region.

For a while, federal help was promoted as the answer. Aid to older cities rose by over 300 percent during the 1970s, but it dropped under Reagan, and as the Washington lifeline became ever weaker, taxes and borrowing by local government rose, making the cities even less competitive. By 1996 the highest costs of doing business were in traditional big cities.

In some places, such as Cleveland, strong business leadership worked to stave off economic collapse. After the 1977 election of populist mayor Dennis Kucinich, the reeling economy (the city lost 131,000 manufacturing jobs from 1947-82) brought Cleveland to bankruptcy. A city that had boasted the third largest concentration of *Fortune* 1000 firms lost a full third of them in the 1970s.

The Mayor's rhetoric did not exactly encourage businesses to stay. "Unless the banks begin to respond to the needs of Cleveland residents," Kucinich warned, "a tremendous uprising of anger and bitterness will be directed against them." But some business leaders, such as former Eaton Corporation president E. Mandell DeWindt, were not about to be chased out of town by the brash 31-year-old "Dennis the Menace." In 1979 they plucked Lieutenant Governor George Voinovich, a Republican from Cleveland's ethnic neighborhoods, to run against Kucinich. Voinovich won and—with the support of some 90 leaders from companies such as TRW, Nestlé, and Bank One gathered under the umbrella organization Cleveland Tomorrow—he initiated a series of economic development reforms and downtown projects like the Rock & Roll Hall of Fame that helped Cleveland recover from its seemingly inevitable decline.

Still, the payoff from Cleveland's much-heralded "turnaround" has been less impressive than widely assumed. Job losses have continued, albeit at a slower rate, and the poverty rate has grown substantially. "We didn't create a booming economy, but we found a reason to exist," says Richard Shatten, former executive director of Cleveland Tomorrow and now professor of public policy at Case Western Reserve University.

Such corporate-led efforts are becoming increasingly problematic. As major firms become more reliant on external capital and markets, many executives face pressures that work against their involvement in local issues. "Globalization has changed people's loyalties," observes Mike Bowlin, president of ARCO, traditionally a linchpin of the L.A. establishment. "Twenty years ago ARCO had Los Angeles in its heart, and we were more of a regional company. Today our operations are all over the country and the world. So the shareholders have to ask, Why is Los Angeles more important to you than Singapore?"

Many of today's corporate executives grew up in the "me" culture of the 1960s and reject out of hand the old standards of *noblesse oblige*. Often they seem willing to shift their headquarters closer to where they live and play, usually enclaves far removed from the city. "That's always the big joke in the real estate business," says Randy Strait of Houston's Transwestern Property Company. "You try to find out where the chairman lives and show him a building nearby."

Even those who stay, Costikiyan notes, tend to be less committed to the city than was true in the past. It's not unusual for top New York executives to establish homes in Florida and other warm-weather places—spurred in part by much lower income and estate

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EVEN ROME COLLAPSED WHEN THE WEALTHY CONTENTED THEMSELVES WITH PERSONAL ENRICHMENT WHILE SHIRKING PUBLIC RESPONSIBILITIES.

taxes—well before retirement and to consider those their preferred domiciles.

Costikiyan adds that the changing character of the New York economy, increasingly dominated by Wall Street financial interests, has also weakened the ties of business elites to the city. Such giants as J.C. Penney, W.R. Grace, American Airlines, Mobil, and Atlantic Richfield have all followed the national tide to the South and West. Wall Street, which remains as Manhattan's bulwark, is by nature a "transactional" community, with most of its funds and profits originating from investments elsewhere. So its ties, Costikiyan says, "tend to be pretty tenuous."

In contrast to the decline of elites in cities like New York and Los Angeles, many smaller cities have developed effective leadership. A classic example is the Research Triangle area of North Carolina, where almost three decades ago a combination of local business, government, and academic planners set out to develop an eight-mile-long series of industrial parks within close range of Duke, the University of North Carolina, and North Carolina State.

To a New Yorker, Raleigh-Durham might seem duller than dull, and insufferably provincial. "Twenty years ago, you'd ask for lox here and people would tell you that the hardware store was down the street," recalls John Kasarda, President of the Kenan Institute at the University of North Carolina. But for firms such as IBM, Burroughs Wellcome, and Northern Telecom, the Triangle's planned environment has proven ideal for attracting skilled technical workers.

The ascendancy of once-peripheral areas will likely accelerate with advances in communications and transportation. Digital technology allows information to be transmitted from remote locations with ever greater ease. Mid-size cities such as Portland, Charlotte, and Orlando now boast direct flights to cities in Asia, Europe, or Latin America. Partly because of their scale, mid-size cities benefit from a more tight-knit leadership. "We have a great sense of common purpose that holds us together here," says Pat Davis, a Seattle port commissioner. "People here know each other. It's easier to cooperate and not attack each other if you've been serving on committees together."

Such a small-town sensibility links the fate of companies to their regions. The development of Microsoft's highly centralized command structure in suburban Redmond reinforces previous decisions by Puget Sound companies to put their main facilities close to home, despite that region's relatively high taxes and soaring property values. Job growth in the Seattle area has averaged nearly 3 percent a year for much of this decade.

The new crop of Seattle billionaires, represented by individuals like Microsoft co-founder Paul Allen, bankrolls not only a host of small technology firms but also the local football team, the Seattle Seahawks, and a $250 million restoration of downtown's old Union Station. Eric Scigliano, senior editor of the alternative *Seattle Weekly*, adds that the "downtown establishment has done an excellent job of bringing the heretics from the media or smaller companies into their club."

Elites in cities well below the top of the population rankings are often adept at regional boosterism. Brad Bertoch, president of the Wayne Brown Institute, a Salt Lake City organization that promotes the region's high-tech industry, sees this as the product of consensus-building among local media, political, and business leaders. Successful local entrepreneurs are regularly lionized in the press and at local business conferences. In such an atmosphere, virtually the entire business community becomes an adjunct of the promotional machine. "The *modus operandi* here," Bertoch admits, "is an ounce of perception is worth a pound of performance."

Perhaps the most cohesive elite is in Atlanta. Ever since the 1960s a unified, promotion-oriented business leadership, anchored by such companies as Coca-Cola and until recently CNN, has boosted the region as among the best for business. Though the city itself is among the poorest and most crime-ridden in America, the region has projected a progressive, prosperous image to the rest of the world. Indeed, from 1980-94, the Atlanta region's population grew more than twice as fast as that of Los Angeles and almost *ten* times as fast as metropolitan New York's, even though the city proper continued to lose residents.

Business consultant Otis White, president of Community Leadership, a consultant group in nearby Decatur, says greater Atlanta's continuing success stems from a strong commitment among its business leaders—with the assent of the political and media elites—to present their region in the best possible light. The city's key players, including both the largely black political establishment and the major corporations, have cooperated on endeavors such as the Olympics, mass transit, and construction of the new Turner Field.

For mega-cities such as New York and Los Angeles, the ability to compete with smaller cities will hinge on the capacity to reinvigorate the local elite. In Mayor Riordan's case, this has meant trying to identify new leaders. The recent creation of the Los Angeles Business Advisors (LABA), including CEOs from over a dozen leading regional employers, has been effective in rallying corporate support for projects such as the Disney concert hall, the new downtown arena, and charter reform. But no group has been able to exercise power on the magnitude of the old elites. "Los Angeles is not like Dallas or [like] Los Angeles was in the period of the Committee of 25," observes ARCO's Michael Bowlin, a LABA member. "You can't run a city like this with 20 white middle-aged leaders. A lot of people wouldn't trust them."

LABA has failed to connect with the entertainment industry—arguably Los Angeles's ascendant economic force. Like Wall Street, Hollywood is led by individuals who are highly cosmopolitan and usually lacking in strong local attachments. They can be generous, but they have mostly focused on specific causes such as AIDS, the UCLA Medical Center, Cedars-Sinai Hospital, the Museum of Tolerance, and the Simon

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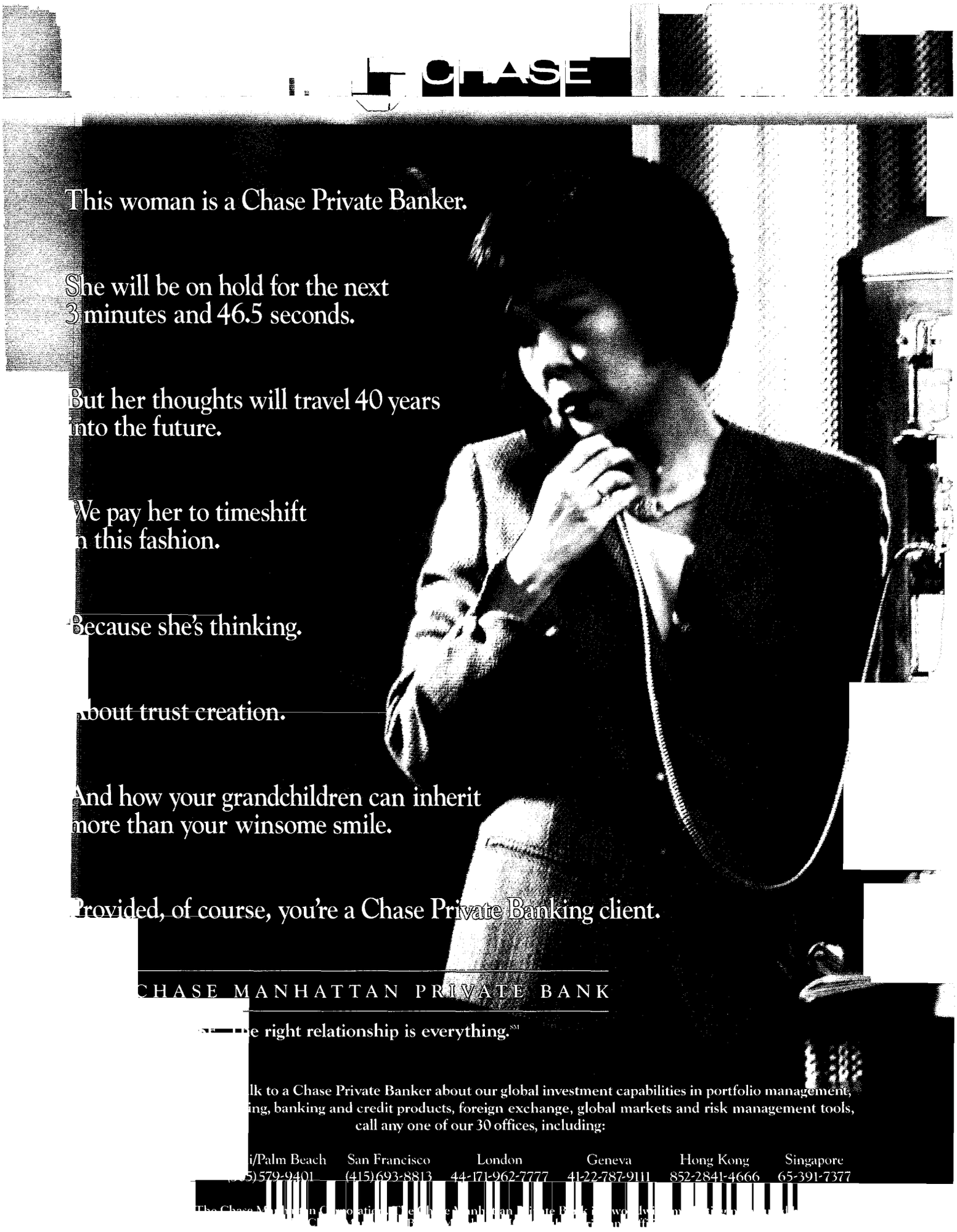
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A City

WHERE BUSINESS AND PHILANTHROPY FLOURISH

BY MICHAEL BARONE ⚜ Looking for a city with a tradition of community involvement, creative local philanthropy, vibrant cultural institutions old and new? Try Grand Rapids. The home town of President Gerald Ford, the city proposed by *Chicago Tribune* publisher Colonel Robert McCormick as a new national capital, Grand Rapids remains largely unknown nationally and even in Michigan is often overshadowed by Detroit. But greater Grand Rapids is now approaching a million people, its strong local economy has led Michigan's economic recovery, and its successful entrepreneurs have built civic institutions the envy of many metro areas two or three times the size. Civil society is alive and well here. ⚜ What are Grand Rapids' secrets? One is a vigorous free market economy, built steadily over decades. Grand Rapids was first settled by New England Yankees and immigrants from Germany and the Netherlands at the falls of the Grand River, in the heart of Michigan's immense forests. Its first industries were lumber and a natural offshoot, furniture. In the first decades of this century Grand Rapids was the nation's leading producer of household furniture. But the forests were overharvested, the furniture market collapsed in the Depression, and after World War II manufacturers relocated to North Carolina.

Some furniture manufacturers who survived turned to office furniture. Today three of the nation's four largest office furniture manufacturers are located in Grand Rapids or nearby Holland. But there is plenty of diversity as well. The city is a leader in injected plastic moldings and a major center for tool and die shops, with lots of small successful firms. It is the headquarters of Meijer, whose 100-plus Thrifty Acres stores combine supermarkets with general merchandise stores—a formula Wal-Mart has copied but has not been able to make pay as well as Meijer. Grand Rapids is the headquarters of Universal Wood Products, the nation's largest fence producer. It is the home of Gordon Foods and Bissell carpet sweepers. It has one large General Motors plant and dozens of auto suppliers. Ada, a village six miles east, is the home of Amway, privately owned by the Van Andel and DeVos families, founded in a garage in 1959, now selling over $7 billion of home care, housewares, and cosmetic products in 52 countries, most of them manufactured in Grand Rapids' Kent County.

Most of Grand Rapids' successful companies are small: 80 percent of businesses employ fewer than 30 people, according to John Caneppa, former chairman of Grand Rapids' Old Kent Bank. Firms that have grown bigger have done so through creative innovation and good employee relations. Local office furniture manufacturers pioneered modular units and electronic connectors. Amway took an old idea—direct sales—and made it work on a scale never seen before. Fred Meijer, to make shopping more pleasant for parents with kids, installed mechanical ponies in his stores which cost one cent per ride and personally hands out "Purple Cow" cards for free ice cream cones.

Employee relations are also an important part of Grand Rapids' success. "We have 60,000 people working with us," Fred Meijer says. "We need them; so let's treat them like we need them." If any of us makes a mistake, he adds, "we don't need to be bawled out, we need to be helped to succeed." That way, the "job will be better, and everybody will be more productive."

Nor is there an adversarial relationship between business and government. "The best thing government can do is to get out of the way," says Grand Rapids City Manager Kurt Kimball. "To try to create an environment that enables the private sector to achieve its ends. Prosperity for business means prosperity for residents. Then we'll have the resources for quality of life." Says *GR* magazine editor Carol Valade, "There is a very low tolerance for government here—the attitude is, I will do it myself. And a tremendous respect for the arts of the entrepreneur. It spills over into government. The city removed 98 percent of its effluents from its sewers, without federal funds—the only city in Michigan to do so."

Successful small businesses and small businesses that have grown large but have stayed headquartered here, have helped build Grand Rapids' cultural institutions. Even the banks have remained local. Old Kent is still based in Grand Rapids, though it has spread outward; First Union sold out to Detroit-based NBD, but David Frey, whose grandfather founded the bank, has kept the Frey Foundation here, and 85 percent of its grants are in western Michigan. "Giving money intelligently is hard work," Frey says. "A lot of due diligence is required. But there's the prospect of great satisfaction."

Anyone walking through downtown Grand Rapids can see some of the reasons for that satisfaction. Twenty-five years ago, downtown Grand Rapids looked dumpy, with aging and often empty commercial buildings, and a grubby convention center. Then Grand Rapids' business leaders decided to make it something special. "Always the private sector has taken the lead,"

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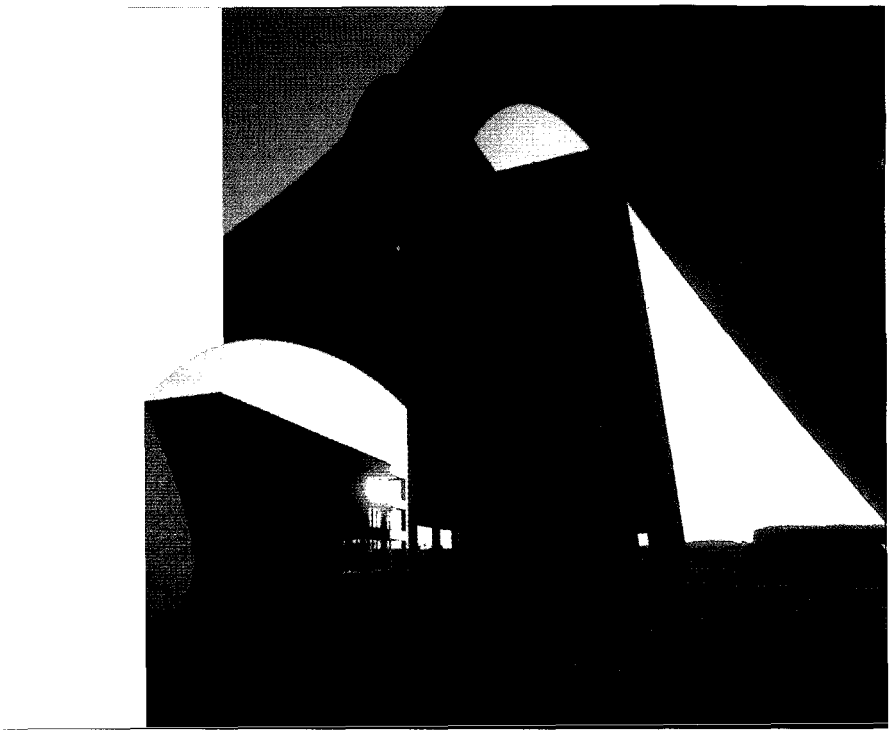

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IN THRIVING GRAND RAPIDS, CIVIL SOCIETY IS ALIVE AND WELL.

says Frey. "And people are willing to put corporate money into projects. Then they would get the city, county, or state governments to forge a coalition." Phase one, in the mid-1970s, included a new Old Kent building and Vandenberg Center, which replaced abandoned warehouses. Phase two included the Amway Plaza Hotel and the Gerald Ford Museum. Phase three includes the recently opened Van Andel Arena for Grand Rapids' minor league hockey and basketball, a new convention center, and a downtown campus for Grand Valley State College.

The secret is leadership and commitment. "We have people who give time and effort and support. They sit at the same table," says Pete Secchia, head of Universal Products, and also a leader of Michigan's Republican Party who served as Ambassador to Italy under Bush. "When we promise something," says Fred Meijer, sitting around a table with other Grand Rapids business leaders, "we don't do it lightly. Not one of us has ever reneged on a promise." If there are problems, someone jumps in and solves them. "The Amway Plaza would be torn down or destitute if Amway hadn't picked it up," Meijer adds.

With no major university or medical school, Grand Rapids has missed out on the boom in biomedicine. But that's likely to change with the building of a Van Andel Institute for nutrition research at Grand Rapids' Butterworth Hospital. Steve Van Andel, who has succeeded his father Jay as co-head of Amway, describes the process. "We watched our fathers build the firm. The second generation got even more involved with the community. The building decision was also made by the second generation of the Van Andel and DeVos families. My dad and family have been discussing it for years. We decided to do something. Dad was always interested in nutrition, so we decided to build an institute that would work on nutrition research and education." He is thinking big. Peter Cook, who owns several big car dealerships and is on the board, says that it has five Nobel Prize winners as advisers and will have 200 to 300 doctors and scientists in a $30 million building.

Grand Rapids' philanthropists are buttressed not by the liberalism of so many national foundations but by traditional virtues. It's an early-to-bed-early-to-rise town, where people eat at home with their families. "Everyone is doing well but restaurants," says Secchia, "but the breakfast joints are filled at 6:30 in the morning." The churches are busy on Sundays, filled with people from all economic levels; the billionaire Van Andels and DeVoses pray at a modest Reform church not far from downtown. Or as Peter Cook puts it, "A lot of our people have done more than their share in giving. We grew up in a Christian home and tithed, and after that you gave more. We give 30 to 40 percent of our income.... That type of thing is very influential. This is a good place to work and live."

Entrepreneurial and religious impulses also inform Grand Rapids' programs to help the poor. Gene Pratt, now retired, tells of raising $1 million in less than two hours to renovate his community center, and how a kids' gardening project produced City Kids Barbecue sauce, got it stocked in Meijer's and other local supermarkets, and got 5 percent of the market. Verne Barry, head of the Downtown Development Agency, came to Grand Rapids in 1985 after living homeless in New York. With ministries and social service agencies he founded Faith Inc., which won competitive contracts with 25 local manufacturers. Hiring people from close-in neighborhoods, his group got commitments for 10 percent of the jobs on projects like the Van Andel Arena. He claims that more than 50 percent of those with little work experience are now in permanent employment.

Grand Rapids has low crime, low unemployment, and scandal-free local government. But statistics tell only part of the story. For Grand Rapids' leaders have put the imprint of their own personalities on the civic institutions they've built. The Grand Rapids Museum hosted an exhibit of the artist Perugino in 1997-98; Secchia helped set it up using his Italian contacts and the fact that Perugia is a sister city. Fred Meijer took over a 20-acre parcel of industrial property and built the Frederik Meijer Gardens, one of the nation's largest conservatories. Amid the plants and the gardens outside he placed 70 bronze sculptures he has collected over the years. You can see him there some days, smiling and enjoying himself as he leads kids around, explaining the plants and sculptures, and handing out Purple Cow cards for free ice cream cones—the spirit of Grand Rapids in person.

Michael Barone, senior staff editor at Reader's Digest, *is a frequent contributor to* TAE.

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The Phony War between Science & Religion over Evolution

By Frederick Turner

How did we get into our present doleful predicament, where the best scientific understanding of how we and the world came to our present state seems to be utterly at odds with the deepest beliefs of many of our most moral and religious citizens? And how can we solve this problem with civility to both decent biologists and intelligent religious folk?

The roots of the problem can be found in the eighteenth-century Enlightenment. Newton's clockwork universe had deeply affected the imagination of the West. The struggle between science and religion, exemplified by the silencing of Galileo by the Vatican, was already a hundred years old. Now truce lines were drawn: Religion conceded to science that the material universe was meaningless, valueless, purposeless, directionless; animals were automatons; every event could in theory be predicted, if one knew the positions, momentums, and directions of all the atoms in the universe. Science in turn conceded to religion the whole realm of freedom, consciousness, meaning, value, purpose, and end. God, Who stood outside the universe, was granted the role of having set the whole machine of the world in motion. Human beings occupied both realms at once (notwithstanding horrendous philosophical problems of how an immaterial mind and a material body could somehow affect each other). If you followed your reason, you would occupy the world of freedom and value; if you followed your passions, you would become one with the world of material bondage and the meaningless brute beasts.

When the theory of evolution by natural selection exploded into the mid-nineteenth century, these truce lines appeared to be shattered. Political interests exploited the confusion. On the irreligious left, the theory of evolution was welcomed as proof that human beings were, just like any other animal, automatons. Thus this new view justified the Romantic agitation for sexual license and economic rebellion familiar to us in nineteenth-century opera and novels.

In a fateful move, the Right and its religious supporters accepted the Left's interpretation of the meaning of evolution and cried foul. If evolution meant what its radical champions claimed, the Right was agin it, and with considerable justice. The truce rules had been violated. Forgetting that the book of Genesis itself traces the line of human descent back to dust and clay, the religious opposition was scandalized by the idea that we were descended from ape-like animals. A human world of meaning, responsibility,

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and freedom from material compulsions could not coexist with this degrading new theory of evolution.

Both sides focused on one relatively minor aspect of evolution—the ancestry of humankind—to the exclusion of more important aspects. Both sides hugely misunderstood the real, amazing point of evolution: Evolution, for the first time in history, had given an intelligible account of how novel realities could come into being. Creation, for the first time, had a rational explanation and a clear program of evidentiary proof for that explanation. In other words, we no longer had to abandon reason when we tried to explain how the universe generates a new moment every moment, how the unbelievable, beautiful richness of animal and plant species might have come about, how the forms of living things are so marvelously adapted to their function, and how the dust of the field, to which all animals demonstrably return when they die, can when rightly arranged give them sentience and autonomous motion. And if we redefine freedom as creativity—the capacity to generate novel realities—then it begins to look as if we have a rational explanation of freedom, too.

Indeed, the real point of evolution is that the universe itself is, to a large extent, free in this creative sense. Thus, far from being a triumph for meaningless determinism, the discovery of evolution might have been a victory for the realm assigned to religion. For the territory of purpose, meaning, value, and freedom was now extended to include at least the living world, and perhaps, if evolution of a kind were taking place even before life emerged, the physical universe as a whole. Human cultural evolution might turn out to be a continuation of this creative process. And if so, the rift between humankind and nature, the artificial and the natural, which had led to the devastation of the countryside by the Industrial Revolution, might be closed and healed.

More recent developments in evolutionary theory have confirmed and deepened this conception of nature as inventive, active, unpredictable, and yet self-ordering. Chaos and complexity theory have shown us the biological universality of self-organizing, non-linear, dynamical systems, where the complex interactions of many elements can constitute an emergent autonomous system. Fetal development, neural networks, ecological balance, and genetic mixing within a species all share the common feature of iteration with feedback as a generator of novelty. The computer can model such processes, demonstrating the pure logic of their operation, while producing unexpected new forms that turn out to be uncannily similar to the designs of nature itself.

Evolutionary theory is now recognizing the role of sexual reproduction in the production of unique individuals, and the efficiency of individuality in speeding the process of evolutionary adaptation to the environment. If a species has a million distinct individuals, each with, say, his own style of foraging for seaweed, it has a million times better chance of finding the best seaweed-foraging technique and perpetuating it through improved rates of reproduction than a species of identical clones would have. The individual is nature's experiment, nature's test-bed for the production of effective novelty. Thus evolution can no longer be seen as the enforcer of biological conformity and uniformity, but as the mother of individual uniqueness.

EVOLUTION PROPERLY UNDERSTOOD IS A RESOUNDING VALIDATION OF THE HUMAN VALUES THAT THE VICTORIAN ANTI-EVOLUTIONISTS WERE DEFENDING.

As evolutionary theory has developed, it has become apparent that evolution itself evolves. The crude "survival of the toughest" of the world of nonliving chemistry gives way to the reproductive survivalism of asexual single-sex organisms, which in turn gives way to the more mysterious modes of quasi-survival that are made possible by multicellular life and sexual reproduction. After all, any self-respecting asexual organism, which reproduces by cloning itself, would surely (if it could have an opinion) regard sexual reproduction, in which the integrity of the parent's genes is randomly scrambled with another's, as lunacy. And reproductive continuity is itself superseded by the amazing human cultural processes of immortalization in history, works of art, myth, and loving memory.

Thus even the way evolution takes place becomes more and more a function of the choices of individuals, more and more—dare I say it?—spiritual. Evolution properly understood is a resounding validation of the human values that the Victorian anti-evolutionists were defending. Ancient theology postulated that spirit emerged from matter by a process of refinement, an idea rejected by Enlightenment rationalism. Current evolutionary theory has in a strange way revived that notion, giving spirit a decisive place in the physical universe.

Yet the political quarrel between leftist evolutionists and religious conservatives has ignored the good news of biology and continued through this terrible century of wars, holocausts, and gulags. The results have been tragic. The secular interpretation of evolution became an important factor in "scientific" racism and the Marxist theory of class struggle, culminating in the ideas of Hitler and Stalin. The great scandal has been that a scientific theory that actually validates freedom and individuality was so distorted as to be put by the Left into the service of totalitarianism.

Meanwhile the conservative religious rejection of evolution led to what amounted to intellectual suicide by a part of the genuine Right. To continue to reject evolution meant that one must believe in a God Who had created the world 6,000 years ago and arranged it with infinite cunning and ingenuity so that it would give every evidence of having come into being over 10 billion years ago—that He had deliberately stocked the geological strata of the planet with fake fossils displaying a consistent record of evolutionary change over some 4 billion years, that He had similarly arranged the genetic codes of His species,

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including mankind, to imply their common ancestry, and that He had somehow started the light of nonexistent distant stars flying inwards from the surface of an expanding sphere centered on the Earth, indistinguishable from the light of real stars less than 6,000 light years away.

Certainly an omnipotent God could do these things, but by any stretch of reason, would He? And if He were such a deceiver, why should He be trusted in anything else He has communicated to us, including the Bible? Even when mainline religious denominations accepted evolution, they did so grudgingly, ignoring its implications and discouraging thinkers, like the French Jesuit priest Teilhard de Chardin, who saw it as consistent with Christian doctrine. What followed were cultist rejections of medical aid, New Age superstitions, and the lacerating controversy over abortion.

Where do we stand now? On the Left are supporters of evolution like Steven Jay Gould, who want the world to be meaningless, purposeless, and directionless, so that academics and government can socially engineer it and provide it with the missing values. If there is no such thing as a human moral nature, no such thing as a natural soul—and if as a secular nation we must discount any supernatural soul—then existentialist lifestyles, state nannyhood, and the university's role as a new priesthood for the national conscience become justifiable. If there is no destiny for the universe and mankind, secular artists and philosophers are free to make one up. Meanwhile on the right are the religious opponents of evolution, who are willing, with pathetic heroism, to entertain the grotesque pseudoscience of creationism as a sort of spiritual-intellectual sacrifice to their faith—*Credo quia absurdus est*—"I believe because it is absurd."

Both sides can be easily refuted with some knowledge of biology and the Bible. The leftist view of nature as devoid of purpose is demolished by a simple thought experiment. Suppose, in a universe devoid of purpose and goals, a random set of genetic mutations created one species that acted as if it had purposes and goals—say, the future survival and perfection of the species itself, even at the cost of self-sacrifice—and also acted as if the universe as a whole were hospitable to such purposes. And suppose that such behavior turned out to be strongly adaptive—that is, promoted superior cooperative behavior, better preparation for threats and opportunities, improved care and nurture of the young, and an enhanced representation of that species' genes in the next generation. This species, with its quixotic and entirely false assumption of meaning in the universe, would out-survive the more realistic species whose assumptions were that no future good is worth striving for and that one should live for the moment.

Over evolutionary time the world would become filled with species that were either descended from the species that imagined the universe is purposeful or had competitively adopted similar behavior in self-defense. We would end up over time in a universe crammed with value, meaning, purpose, and destiny. This, in a nutshell, is what has been discovered to be the fact by the sociobiologists and evolutionary psychologists, who now accept that altruism, and the implied plan of species survival, is at the core of animal behavior. This is why the old guard of leftist evolutionists is so bitterly opposed to sociobiology. If human beings are at least partly moral by nature, there may be no need for academics to invent a secular morality and brainwash it into the heads of young citizens.

The religious anti-evolutionists, however, are vulnerable from an entirely different direction. Oddly enough, they are just as much children of the Enlightenment as their left-wing secular enemies. The Bible is actually a deeply evolutionary work. It tells of a God Who is emphatically not outside of time and the universe, Who is in a continuing and developing relationship with human beings and the world, Who creates the world in sequence, starting with the simplest forms of being and culminating with the most complex and conscious ones. Jesus tells parables like those of the sower and the mustard seed, which, given the terms that first-century Jews might understand, could scarcely be a clearer explanation of the principles of selection and adaptation: If Darwin were to go to ancient Palestine, he would probably start talking with these experienced plant and animal breeders in precisely such terms—the seed falling on barren ground and fertile, being eaten by predators, and so on. Even in the book of Genesis we see Jacob, a fine stockbreeder, arranging to produce piebald sheep, the process symbolized by a caduceus whose iconography in the Kabbala suspiciously resembles the DNA molecule.

The Bible's God is deeply involved with nature, with Job's whirlwind and the leviathan, Someone for Whom the style of creation by evolution would be entirely in character. The Enlightenment's God, Who would create the world complete, in a sudden, eternal, and arbitrary moment, might be an awesome being to imagine, but He is not the God of the Bible, and religious anti-evolutionists need to be deeply concerned about the possibility that, with the best of motives, they may be nursing an eighteenth-century rationalist heresy.

Sadder still, on the New Right there are some who, I believe, know that evolution is true but who have been persuaded by their uneasy allies among the religious conservatives that it is not good for the people at large to know it. Such scholars, faced with a choice between truth and morality that I hope has been shown to be unnecessary, have chosen morality. I could not criticize their choice, if truth and goodness were really at odds here. The great political philosopher Leo Strauss has shown how such thinkers as Plato, Locke, and Mill found it necessary to cloak their wisdom about the darker side of human social origins in a noble fiction that would preserve public ethics. But in this case it is not required that one sacrifice one's honesty to one's prudence. For sociobiology, amazingly, shows that evolution can produce exactly the sort of responsible and altruistic moral behavior of which conservatives approve.

Today the God of nature looks very much more like the God of the Old and New Testaments, and the God of other great world religions, than like the abstract God of the Enlightenment. Evolution is perhaps God's own vital signs. And this means that in the old language of communion, we are literally gathered into the body of God. Numbered, perhaps, among the humble and ignorant neurons of His Mind.

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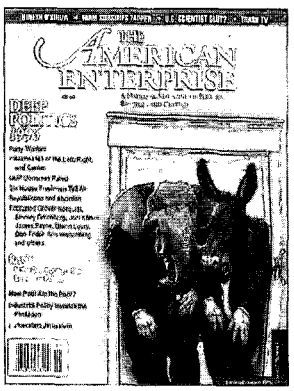

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NOT A CHANCE

LIFE CANNOT HAVE FORMED BY ACCIDENT

By Dean L. Overman

MANY PEOPLE TODAY BELIEVE THAT LIFE ON EARTH ORIGINATED AS A RESULT OF RANDOM ACCIDENTS. MOST OF US VAGUELY RECALL HAVING HEARD OF SCIENTIFIC EXPERIMENTS INVOLVING MIXTURES OF INANIMATE MATERIALS THAT ARE SAID TO BE SIMILAR TO THE "PREBIOTIC SOUP" THAT EXISTED BEFORE LIFE BEGAN. THE MIXTURES ARE HIT WITH AN ELECTRICAL SPARK THAT SIMULATES A LIGHTNING STRIKE, AND AMINO ACIDS—BUILDING BLOCKS OF LIFE—RESULT. SO WE'RE ASSURED THAT A SIMILAR ACCIDENTAL TRANSFORMATION LONG AGO CAUSED LIFE TO ORIGINATE FROM NON-LIVING MATTER.

But in fact, recent discoveries in molecular biology, particle astrophysics, and the geological records raise profound doubts about all this. Three questions should be investigated: (1) Is it mathematically possible that accidental processes caused the first form of living matter? (2) If accident is mathematically impossible as the cause of the first form of living matter, are other popular scenarios that matter "self-organized" into life plausible? (3) Is it mathematically possible that accidental processes caused the

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"The chances that life just occurred are about as unlikely as a typhoon blowing through a junkyard and constructing a Boeing 747."

formation of a universe that is compatible with life? In examining these questions, I will use the widely accepted scientific definition of life, which holds that living matter processes energy, stores information, and replicates.

To answer the first question—the likelihood that random accidents turned inanimate matter into living matter—I will address only the molecular biological aspects. Consider a calculation by the famous (atheist) scientist Sir Fred Hoyle. Hoyle understood that even the simplest living cells are extremely complex, containing many nucleic acids, enzymes, and molecules all joined together in a very precise sequence. He calculated the odds of each of 20 amino acids appearing in the correct sequence to form an enzyme as 1 chance in 10^{20}. Since the simplest living cell requires 2,000 functioning enzymes, the odds against the amino acids appearing in the correct sequence for a living cell were equal to 1 in $10^{20} \times 2{,}000$—or 1 chance in $10^{40{,}000}$. This number is a *1* followed by 40,000 zeros. Because mathematicians normally regard a chance of 1 in 10^{50} as mathematical impossibility, Hoyle concluded that life could not have appeared by earthbound random processes, even if the whole universe consisted of prebiotic soup. His collaborator Chandra Wickramasinghe put it more dramatically: "The chances that life just occurred are about as unlikely as a typhoon blowing through a junkyard and constructing a Boeing 747."

To appreciate the size of 10^{50}, consider that if you assume the Big Bang occurred 15 billion years ago, only 10^{18} seconds have occurred in all of time. The number of atoms in the known universe is estimated to be only 10^{80}. Physicist Paul Davies has equated the odds of one chance in 10^{60} as equal to the odds against hitting a one-inch target with the random, unaimed shot of a rifle bullet from a distance of 20 billion light years. One chance in $10^{40{,}000}$ is far beyond mathematical possibility.

Actually the odds of life forming by random processes are even worse, for several reasons. First, scientists are discovering many reasons to think that conditions on Earth were not as the prebiotic soup experiments assume. Second, there is absolutely no physical evidence for the existence of either the prebiotic soup or many of the substances the experiments produced. In fact, evidence of prebiotic soup that should have been left behind in geological records does *not* exist. Third, even if amino acids did form in an ancient prebiotic soup, there are still astronomical odds against those amino acids joining together to form even very short proteins, much less the DNA found in all life.

Worst of all, recent discoveries in the fossil records reveal that only 130 million years were actually available for life to appear on Earth by accidental processes. The Earth formed about 4.6 billion years ago, but was too torrid to support life until about 3.98 billion years ago. Fossil records discovered recently (particularly in the Istaq complex in Greenland) show life existed at least 3.85 billion years ago. That means only 130 million years were available for random processes to form the first living matter, not the billions of years we once thought. This makes the odds even more remote that accidental processes would have produced the first form of living matter. Chance had no chance to form life.

Our second question concerned the plausibility of current theories that matter "self-organized" itself into life according to the laws of physics and chemistry. To understand the idea of self-organization, we must recall the Second Law of Thermodynamics, which requires that any system near equilibrium will always move toward disorder (also known as entropy). Yet sometimes an energy flow can cause disordered inanimate matter to organize spontaneously into an ordered system. Consider this example: Picture a bathtub filled with water where the water molecules are in equilibrium—warmer water is mixed evenly with cooler water so that the water molecules are all at an even temperature and distributed in a totally random, unordered manner. Pulling the drain plug allows the force of gravity to move the water from this chaotic, random state of equilibrium into an ordered vortex. This example demonstrates how an energy flow (such as that derived from the force of gravity) can move a system away from equilibrium and cause the spontaneous creation of order.

Could a similar sort of self-organization create life? Well, living matter must contain sufficient complex information (or instructions) to be able to maintain and replicate itself. Here information theory is useful, because it allows us to quantify the amount of information in living and non-living matter in terms of bits and bytes.

The enormous information in living matter involves irregular, flexible patterns, while inanimate matter never rises above simple, repeating patterns in its information content. A quartz crystal, for example, has simple order and replicates, but it has very little information content and is not alive. By contrast, DNA exists in all living matter and contains a vast amount of information that allows organisms to replicate and maintain themselves, that is, to live. The DNA for even the smallest single-celled bacterium contains over 4 million instructions. These instructions are encoded in DNA's four "bases"—the rungs of the famous double helix ladder of DNA that are denoted A, G, C, T. The bases act like a four-letter alphabet for the genetic process. This process, like the English language, consists of a code. Acting like sentences, DNA instructions pass on the information needed to form a protein or some other necessity that the living organism needs in order to replicate or maintain itself.

The problem with self-organization theorists is that the mechanisms they claim could create life lack any plausible method of generating the sort of information DNA contains. Their scenarios only describe the formation of *order*, not complex *information*. They like to use the term "complexity" in their work, but all they mean by it is highly organized, intricate patterns, which is not a definition capable of distinguishing quartz crystals from rhododendrons or amoebae.

Self-organization scenarios claim that the laws of physics (and the laws of chemistry they produce) caused the formation of living matter. But this idea faces a grave obstacle—the simple mathematical fact that the genetic information contained in even the smallest living organism is much larger than the in-

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formation content found in the laws of physics, as Hubert Yockey, a Manhattan Project physicist, noted in *Information Theory and Molecular Biology.* Where did the greater information content of life come from? This fundamental difficulty has not been addressed by the theorists of self-organization.

Even if we ignore this fundamental mathematical fact, there is also the problem that the laws of physics only produce regular patterns. DNA—life—requires an irregular pattern to transmit information through the genetic code. To use an analogy to the code in our written English language, if I type the letters "ABC" repeatedly for 1,000 pages, I would have a highly ordered, regular, predictable pattern such as a law of nature would produce. But I would have conveyed very little information. The *Oxford History of the American People*, on the other hand, has an irregular pattern in its alphabet letters, and it conveys a large amount of information. Similarly, DNA varies its letters A, C, T, G in order to transmit the genetic code.

Flexibility and the lack of a regular, predictable pattern in DNA argue against the existence of an inherent law that controls the operation of DNA. A physical law produces a regular, predictable pattern, such as the law of gravity produced in the ordered vortex of water in our bathtub example. If DNA were caused by such a law, it would have a simple repeating sequence (like ABCABC) without much information. And DNA would not be capable of transmitting millions of instructions, as it does in even the simplest living organism.

The Oxford chemist Michael Polanyi recognized this in 1953. Just as the information contained in a poem is not determined by the chemicals in the pen used to write the poem, so the information in the genetic code, although encoded in a four-letter alphabet, is not determined by the chemical elements of that alphabet.

One can only speculate whether an adequate self-organization theory will ever be discovered. At present we must conclude that the information content required in the simplest living form of matter could not have arisen only from the laws of physics and chemistry.

Let us turn to our third question, which involves particle astrophysics and the likelihood of a universe forming in such a way as to be compatible with life. Many proponents of chance as the cause of life proposed their theories when the universe was believed to be in a steady state and infinitely old. In an infinite, ageless universe, anything can happen, but now scientists view the universe as young, expanding from a definite beginning, and approximately 15 billion years old.

Contemporary physics has also discovered that the physical universe appears to be precisely fine tuned in numerous ways that accommodate the formation of life. At the very outset of the Big Bang, the mass of the elementary particles, the strength of the four forces, and the values of the fundamental constants were very precise. Imagine that you are selecting the values for these natural quantities by twiddling a vast number of knobs. You would find that almost all knob settings would render the universe uninhabitable. All these many knobs would have to be fine tuned to enormous precision if life is to flourish in the universe.

In fact, our universe is so remarkably fine tuned to allow for the origination of life that one may think of it as a finely sharpened pencil standing vertically on its graphite point in a precarious balance. Any deviation in a myriad of physical values would cause the pencil to tilt, fall, and preclude the formation of life. The fine tuning is exactly what is required not just for one reason, but for two or three or five reasons. Accidental processes could not plausibly tune these fundamental astrophysical values first one way and then another to satisfy conflicting requirements for the development of life.

There are many examples of this extraordinary fine tuning, but consider only a few:

• *Fine tuning in the formation of carbon.* Life would be impossible without carbon, and yet because of the precise requirements for its existence, the carbon atom should be very scarce. The formation of a carbon atom requires a rare triple collision known as the triple alpha process. The first step in this process occurs when a helium nucleus collides with another helium nucleus within a star. This collision produces an unstable, very ephemeral isotope of beryllium. When the unstable, short-lived beryllium collides with a third helium nucleus, a carbon nucleus is formed. Astrophysicist Sir Fred Hoyle predicted the resonances (or energy levels) of the carbon and oxygen atoms. The resonance of the carbon nucleus is precisely the right resonance to enable the components to hold together rather than disperse. This resonance perfectly matches the combined resonance of the third helium nucleus and the beryllium atom. Hoyle admit-

A BEAUTIFUL UNIVERSE

John Polkinghorne, a particle physicist at Cambridge, writes in Beyond Science *that*

> it is *mathematics* which gives us the key to unlock the secrets of nature. [The Nobel-laureate physicist] Paul Dirac spent his life in the search for beautiful equations. That is a concept not all will find immediately accessible, but among those of us who speak the language of mathematics, mathematical beauty is a recognizable quality.... Time and again we have found that it is equations with that indispensable character of mathematical beauty which describe the nature of the physical world. If you stop to think about it, that is a very significant thing to have discovered. After all, mathematics arises from the free rational exploration of the human mind. Yet it seems that our minds are so finely tuned to the structure of the universe that they are capable of penetrating its deepest secrets.

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The enormous information in living matter involves irregular, flexible patterns, while inanimate matter never rises above simple, repeating patterns.

ted that his atheism was dramatically disturbed when he calculated the odds against the precise matching required to form a carbon atom through this triple alpha process. He said the number he calculated from the facts is so overwhelming as to put almost beyond question the conclusion that a superintellect had monkeyed with the laws of physics.

• *Explosive power of Big Bang precisely matched to the force of gravity.* Physicist Paul Davies calculated that the matching of the explosive force of the Big Bang and gravity had to match to one part in 10^{60}. If the explosive force were only slightly higher, the universe would consist of gas without stars or planets. If the force were reduced by one part in a thousand billion, the universe would have collapsed back to a singular point after a few million years.

• *Fine tuning in the strong and weak nuclear force.* The strong force which binds the particles in an atom's nucleus must be balanced with the weak nuclear force to a degree of one part in 10^{60}. If the strong force were any weaker, atomic nuclei could not hold together and only hydrogen would exist. If the strong force were only slightly stronger, hydrogen would be an unusual element, the Sun would not exist, water would not exist, and the heavier elements necessary for life would not be available.

• *Fine tuning of electromagnetic force and ratio of electron mass to proton mass and proton mass to neutron mass.* Any deviation in the strength of the electromagnetic force would also preclude the molecular formation necessary for life. The electromagnetic force must be precisely balanced with the ratio of electron mass to proton mass. The proton is 1,836 times heavier than the electron. This fundamental ratio must be very finely adjusted to make life possible. Moreover, the mass of the proton and the mass of the neutron are meticulously balanced. The emergence of life depended on an astounding precision among the masses of these three particles.

• *Fine tuning of the order at the initial Big Bang.* The Second Law of Thermodynamics requires that disorder in the universe tends toward a maximum. Because the universe could not have been dissipating from infinity or it would have run down, it must have had a beginning—a very highly ordered beginning. If the Big Bang is regarded as only an impressive accident, there is no explanation why it produced a universe with such a high degree of order, contrary to the Second Law.

Oxford mathematician Roger Penrose calculated that at the very beginning of the Big Bang, the precision required to set the universe on its highly ordered course in which life could develop was staggering: "an accuracy of one part in $10^{10^{123}}$." Penrose adds, "This is an extraordinary figure. One could not possibly even write the number down in full, in the ordinary denary notation; it would be *1* followed by 10^{123} successive *0*s! Even if we were to write a *0* on each separate proton and on each separate neutron in the entire universe—and we could throw in all the other particles as well for good measure—we should fall far short of writing down the figure needed."

• *Fine tuning in the precision between counter-intuitive abstract mathematics and the physical world.* An accidental universe cannot explain the astounding agreement between abstract mathematics and the laws of the physical world. Abstract mathematics have predicted counter-intuitive phenomena to a remarkable precision. For example, the agreement between the counter-intuitive theory of general relativity and the physical world has been confirmed by experience to more than one-trillionth of a percent. Precision to this degree cannot be explained by chance alone. Similarly, the strange, unseen, counter-intuitive subatomic world of quantum mechanics matches the predictions of abstract mathematics to a remarkable degree. Our minds seem to be finely tuned to the structure of the universe. This fine tuning cannot be understood as a curious spin-off from the need of our ancestors to dodge a wild animal.

Because the mathematical probabilities against life arising by accident are so overwhelming in our universe, some scientists are attracted to the concept of an "oscillating" universe in which, crudely put, there is an infinite cycle of Big Bangs and Big Crunches as the universe expands and contracts. This would permit an infinite number of beginnings. Since infinity can be used to explain almost anything, a person displeased with the unlikeliness of an accident causing life to form may grasp at any opportunity to bring infinity into the picture. Stephen Hawking and Roger Penrose, however, have demonstrated that the gravitational force in a collapsing universe would produce a Big Crunch that would be totally chaotic, and the entropy at the Crunch would be so large that it would preclude another expansion.

There are other abstruse theories that try to concoct similar scenarios in which the universe didn't begin in the Big Bang but somehow always existed. Those who put such theories forward implicitly recognize that if the universe did have a beginning and did arise out of nothing, then something must have caused it. I deal with these theories in my book *A Case Against Accident and Self-Organization,* where I show that they suffer from the same sort of physical and logical difficulties as the oscillating universe theory.

In sum, the case against chance as the cause of life is satisfied completely by the probabilities involved in the fine tuning of particle astrophysics. When one couples these probabilities with the molecular biological probabilities we've considered, the compounded calculation wipes the idea of accident entirely out of court.

Nor does a plausible self-organization theory exist. The answer to the question of life's formation will not be found in the laws of physics and chemistry, because life transcends those laws in the vast information it possesses and in the irregular flexible patterns it uses to convey this information. The physical sciences, in short, lead us to conclude that life is more than a physical thing, which means we should be open-minded about the possibility that other fields of study can teach us something about the origin and meaning of life.

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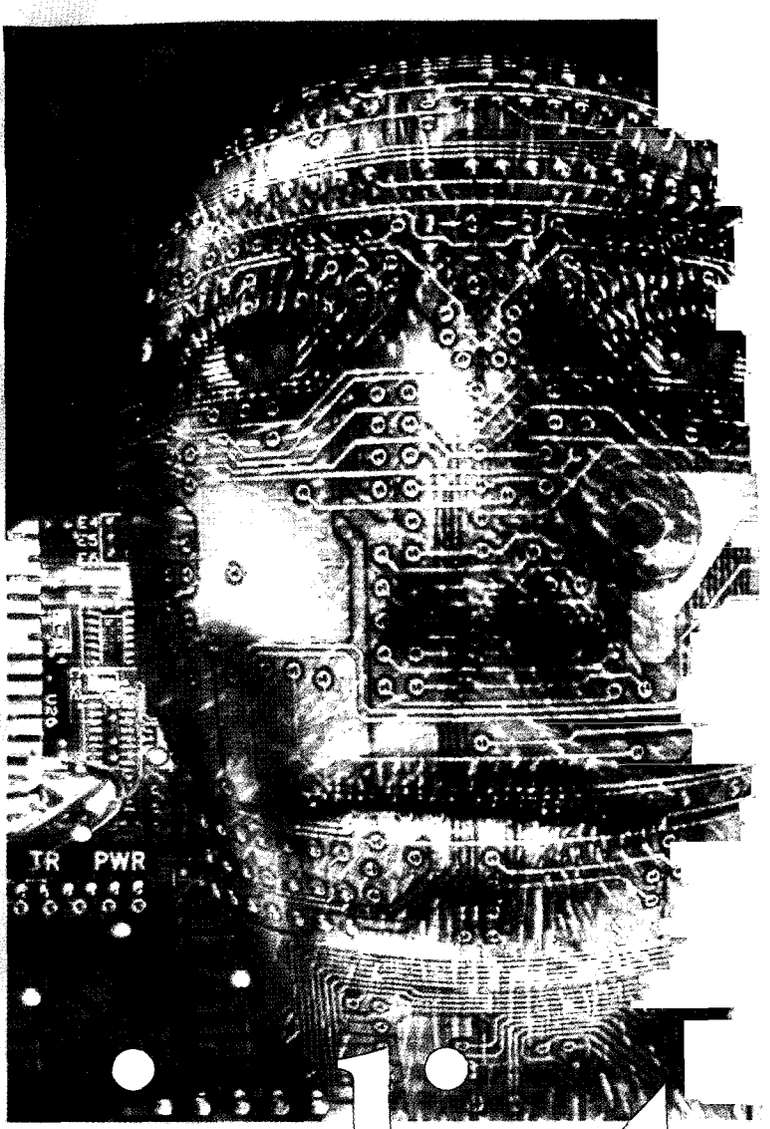
By George Gilder



The Materialist

The continued prevalence of the materialist superstition was manifest in a recent *Time* cover story titled "In Search of the Mind." The magazine authoritatively declaimed that "consciousness may be nothing more than an evanescent by-product of more mundane, wholly physical processes." According to one neuroscientist, "being awake or being conscious is nothing but a dreamlike state" that has "no objective reality" because we can "never actually touch or measure it."

This materialist superstition has long roots in Western culture. Indeed, for 300 years most intellectuals have been dedicated to its agenda of self-destruction by seeking to overthrow mind and replace it with inert, blind, and meaningless matter. The effort originated in the triumph of Newtonian physics in the seventeenth century. Newton was himself a deist, but he had a vision of the world that was profoundly materialistic and determinist. He believed that at the basis of the universe were solid, immutable, impenetrable, mindless bits of matter. Further, he maintained that the universe was built up from these bits of matter in a great determinist machine, like the workings of a clock. Although he acknowledged his theory required a watchmaker God, this need was rejected by followers who exulted in the enormous power over nature that machines based on Newtonian physics gave them.

Since man subsists not on his practical possibilities but on his ultimate philosophies, this sort of materialist determinism soon became the implicit religion of science and the profound enemy of all other religion and morality. Even as the scientist's practical advances promised to prolong life and enrich its pleasures, his philosophy seemed to destroy life's meaning.

The computer initially contributed to this vision of materialist determinism, because even human intelligence was now seen as likely to succumb to a mechanistic rival. In gaining dominion over the world, we worried about losing control of our own machines. When transistor switching speeds plummeted into the trillionths of a second, it seemed plausible that for all its

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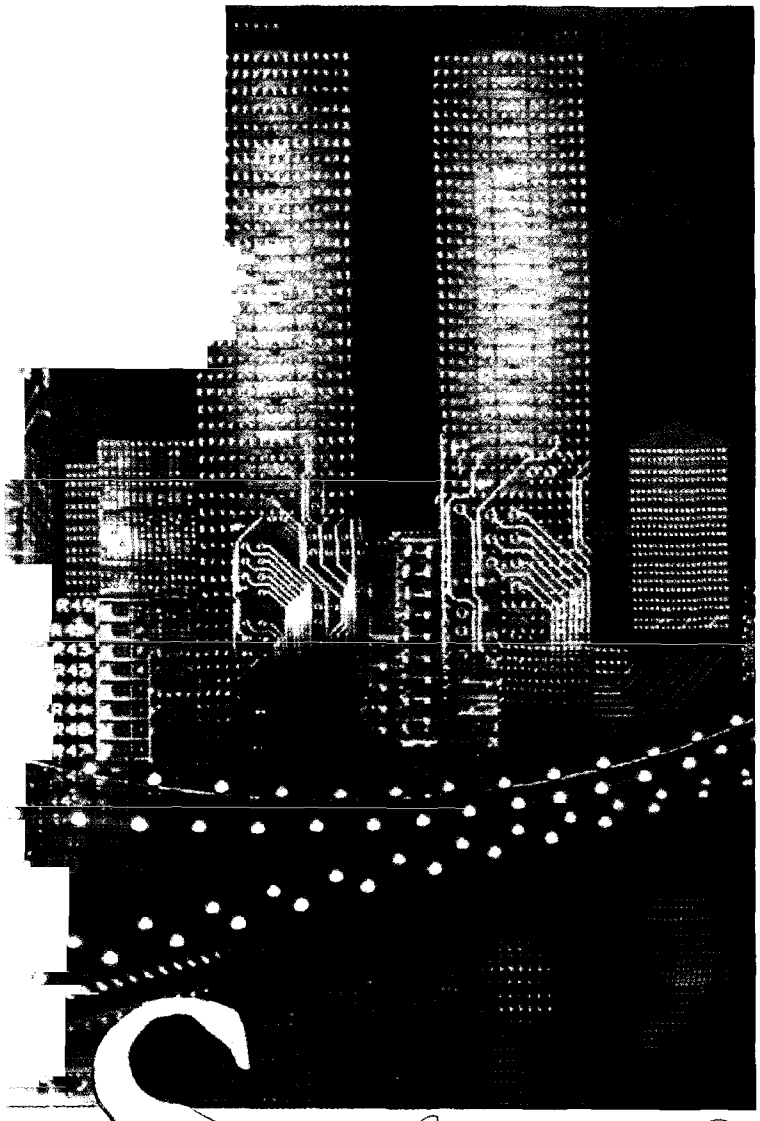

Superstition

With science believed to have abandoned man and the dignity of his soul, men rose up to claim the dignity of science for squalid temporal schemes of the State and to ascribe soul to the new machines. Religion, in turn, after having contributed indispensably to the birth of science, began renouncing the great human enterprise of understanding and mastering nature.

Desperate to reassemble the shattered grail of faith, the public clutched at a new pagan polytheism: Materialist intellectuals widely worshipped the god of the machine, artists reveled in the god of the senses, and churches retreated to a pre-industrial vision of an ecological Eden.

People came to believe in a religion that closely resembles that of pygmies in the jungle: believe only in things you can see, and touch, and measure. The pygmies worship the Sun, the trees, and the world. Modern intellectuals worship the measurable, palpable, visible, mechanical kinds of phenomena that their senses can present to them, and deny as a matter of principle all that exists beyond this domain.

The pygmies in the jungle have at least this advantage: they believe the trees are fundamentally alive. The vision emerging from the triumph of materialism was one of death. Modern science granted us incomparable riches, but only as part of a Faustian pact: a deal with the devil whereby we gained wondrous machines in exchange for our very souls. Plunging into the world of modern science, we lost first our human dignity and then our free will. The physical world was ultimately a tomb: the death site of both God and man. God died with the eclipse of the Creator and the end of meaning. With the death of human dignity and uniqueness, man degenerated into a mere intelligent machine that differed from a computer chiefly by thinking more slowly, and by more quickly and irremediably wearing out.

user-friendliness and endearing idiosyncrasies (such as "common sense") the brain was no longer "merely a computer" but in fact far inferior to computers in speed and computing power.

The computer thus lent enormous new authority to the determinist vision. Not only could it be used to achieve enormous new advances across the range of the scientific enterprise, but the computer itself constituted a model for comprehending the very fabric of thought in materialist terms. The computer seemed to subordinate thoughts to things, mind to matter, soul to solid-state physics. It seemed to unmask the mind and demystify it, and thus to banish sacred and spiritual powers from the world.

Yet all this anguish and ardor, all the fatalist philosophies of nihilism and existentialism, were mere delusions arising from the great modern superstition of materialism, a superstition that has now been refuted by an entire century of modern science and by the findings of computer theory itself. For the central fact of the twentieth century is not the overthrow of mind, but the overthrow of matter.

The overthrow of matter reached its climax in the physical sciences when quantum theory capsized the rules that once governed all solid objects. Scientists no longer see the foundation of all matter as inert, blind, impenetrable particles. Rather, physicists now agree that matter derives from waves, fields, and probabilities. To comprehend nature, we have to stop thinking of the

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world as basically material and begin imagining it as a manifestation of consciousness, suffused with sparks of informative energy.

The fundamental entities in quantum theory are wave-particles, a profound paradox that was first launched in 1887 when Albert Michelson and E. W. Morley did their famous experiments which showed that there is no ether in the universe. Until the experiments of Michelson and Morley, the fundamental belief was that the universe is filled with solid matter—"ether"—which would be needed as the medium through which light waves could move just as sound waves travel through air. Earlier experiments had demonstrated conclusively that light is a wave; it was assumed, therefore, that a material medium must exist through which the waves of light could travel. By dispelling the notion of ether as the medium bearing light, Michelson and Morley effectively banished most of the matter from the universe.

Light emerged as an esoteric paradox of waves without substance that travel at a fixed speed in relation to a medium without substance. In 1905, Albert Einstein declared that if there were no ether, light could not be a wave; it had nothing to wave through. Instead, Einstein said, light consisted of quanta—packets of energy—that he called photons. Although said to be "particles," photons observed the equations of wave motion developed by James Clerk Maxwell in the 1860s. They seemed to be a cross between a wave and a particle.

In terms both of classical physics and of human observation, this wave-particle cross was an impossible contradiction. Waves ripple infinitely forth through a material medium; particles are single points of matter. At once definite and infinite, a particle that is also a wave defies our sensory experience. In successive steps, Niels Bohr, Louis de Broglie, Werner Heisenberg, and others showed that not only light but also electrons, protons, neutrons, and other atomic "particles" likewise exhibited wave action. Eventually, the paradoxical duality of wave-particles would come to exclude all materialist logic; quantum physics does not make materialist sense.

Quantum physics can make sense, however, if it is treated in part as a domain of ideas, governed less by the laws of matter than by the laws of mind. Atomic phenomena, the paradoxical stuff of the quantum domain, seem to represent the still-mysterious domain between matter and mind, where matter evanesces into probability fields of information and mind assumes the physical forms of waves and particles. Paradox, which is a perplexity for things, is a relatively routine property of thoughts. Conceiving of the quantum world as a domain of ideas, we make it accessible to our minds. The quantum atom is largely an atom of information, a rich domain of information at the foundation of matter.

THE TRIUMPH OF THE COMPUTER DOES NOT DEHUMANIZE THE WORLD; IT MAKES OUR ENVIRONMENT MORE HUMAN.

Thus the fundamental entity in quantum theory is a cross, a cross between a wave, which is infinite in extent, propagating infinitely through its surrounding medium, and a particle, a point of no extent. All the universe is based on these crosses of waves and particles which are utterly paradoxical, but which deeply accord with the fundamental paradoxes of the Christian religion: the Word made flesh, the God-Man, the eternal and the temporal, the infinite and the particular. In place of what had been an inert, blind bit of matter at the foundation of the universe, we find a cross.

If the discovery of the wave-particle was the first great breakthrough in the battle against materialism, the second breakthrough came in 1975 from neurosurgeon Wilder Penfield of Princeton. Penfield's researches were altogether as unprecedented as the ether tests. He performed surgery on 1,132 epileptics over a 30-year period. After removing a part of the skull of the patient under anesthesia, he would bring him back to full consciousness. Then Penfield would explore the brain widely with an electronic probe. Since the brain lacks sensitivity, the patient, though fully alert, could feel no physical pain.

With the patient reporting the results of stimuli at different cerebral sites, the doctor would often find and remove the cause of the epilepsy. In the process, Penfield gained a unique and voluminous body of data on the responses of different parts of the brain to an electrical stimulus, and he made many original contributions to the mapping of brain functions.

But as in the case of Michelson and Morley's ether tests, more important than all Penfield's findings was a momentous absence: Nowhere in the *brain* did he discover any evidence of *mind*—the consciously deciding, willing, imagining, and creative force in human thought. Penfield summed up his conclusion:

> The electrode can present to the patient various crude sensations. It can cause him to turn head and eyes, or to move the limbs, or to vocalize and swallow. It may recall vivid re-experience of the past, or present to him an illusion that present experience is familiar, or that the things he sees are growing large and coming near. But he remains aloof. He passes judgment on it all. He says, "things are growing larger," but he does not move for fear of being run over. If the electrode moves his right hand, he does not say, "I wanted to move it." He may, however, reach over with the left hand and oppose his action.

Penfield found that the content of consciousness could be selectively altered by outside manipulation. But however much he probed, he could not enter consciousness itself. He could not find the mind or invade its autonomy. Penfield concludes, "The

FREE SPIRIT

We are part of nature, obedient to natural laws. But we also stand back from nature, and make choices which we believe to be free. Nature has a meaning for us—many meanings—and we classify it in ways which could find no place in scientific theory. When we see another's smile we see human flesh moving in obedience to impulses in the nerves. No law of nature is suspended in this process; we smile not in spite of, but because of, nature. Nevertheless, we understand a smile in quite another way: not as flesh, but as spirit, freely revealed.

—Roger Scruton, *An Intelligent Person's Guide to Philosophy*

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"EXACT SCIENCE" vs. THE FREE MARKET

Besides skill and character, another element that becomes dismissed in a world modeled in exact essences is the opportunity to take risks and to discover new alternatives in regard to the production and distribution of goods. Economists have shown that uncertainty in business and industry actually improves productivity and distribution because it provokes imaginative, more efficient responses to problems. But the problems, with their uncertainty and risk, have to be allowed to make an impression on the people who are supposed to deal with them. To shield individuals and groups from risk may make the large-scale future—that of the country as a whole, or that of the industry as a whole—more unstable, because the many small adaptations that are necessary are in fact never made. Competition and uncertainty improve economic performance and even reduce unemployment, thus contributing to long-term stability. Uncertainty and its attendant risks are therefore beneficial for modern economic life. However, economic theories that employ exact essences will tend to neglect uncertainty by imaginative individuals. When such theories become the basis for economic policy, the policies will tend to suppress imprecision and will not tolerate uncertainty. Bureaucracies and regulatory agencies are much more at home in the world of exact essences than in the world in which uncertainty must be acknowledged. And governmental policies that try to eliminate ambiguity also discourage, and finally prevent, groups and individuals from taking risks, that is, from making choices....

Skills, virtues, and the ability to handle risk are required because there is imprecision and indeterminacy in being. It is not just that we are confused or ignorant about how things are; indeterminacy is real, and the things themselves are truly undetermined.

—Robert Sokolowski, "Exact Science and the World in Which We Live"

patient's mind, which is considering the situation in such an aloof and critical manner, can only be something quite apart from neuronal reflex action.... Although the content of consciousness depends in large measure on neuronal activity, awareness itself does not."

Like Michelson and Morley before him, Penfield began his investigations with the goal of proving the materialist superstition. Like them, he failed utterly. "I like other scientists have struggled to prove that the brain accounts for the mind." Instead, he showed that the brain's activity always occurred within the dominating and enveloping radiance of an autonomous mind. While Penfield's electrodes could cause specific events, he could not usurp awareness of them. The patient could always distinguish between authentic mental processes he had willed and processes evoked by the probe. Stampedes of electrons could not cause a conscious whim in the mind, but a whim of the consciousness could cause stampedes of organized electrical and chemical activity in the brain.

Penfield's book is entitled *The Mysteries of the Mind,* but he did not purport to have resolved those mysteries before he died. His conclusion, however, accords with the reports of anguished armies of other investigators throughout the domains of cognitive science, neurophysiology, and artificial intelligence. Computer pioneer Norbert Wiener made the essential point as early as 1948: "The mechanical brain does not secrete thought 'as the liver does bile,' as the earlier materialists claimed, nor does it put it out in the form of energy as the muscle puts out its activity. Information is information, not matter or energy. No materialism that does not admit this can survive at the present day."

The brain is a kind of computer. But if the brain cannot function without a human mind, it should not be surprising that a computer cannot function without a human mind either. The idea of the computer as a mind, not an artificial brain, is an idol of the materialist superstition. The human brain serves the mind. The artificial intelligence vanguard wanted to show that the mind was merely brain in order to support the notion of building computer minds. But the industry will now have to give up its goal of usurping mind and focus more effectively on serving it, as the brain does.

In his book, Penfield gave a clearer view of the relationship between mind, brain, and computer: "Because it seems to me certain that it will always be quite impossible to explain the mind on the basis of neuronal action within the brain... and because a computer (which the brain is) must be programmed and operated by an agenda capable of independent understanding, I am forced to choose the proposition that our being is to be explained on the basis of two fundamental elements." He concluded, "The mind seems to act independently of the brain in the same sense that a programmer acts independently of this computer, how ever much he may depend upon the action of that computer for certain purposes." Penfield's researches were compelling and unprecedented. But it is impossible to prove a negative. That his elaborate probes failed to find the mind in neuronal activity does not establish that the mind is not matter.

So in the long run, the quantum revolution in physics provides a more powerful reason for moving beyond the materialist superstition to a recognition that thought dominates things. Once this move is made, the reverberations sweep through social science as well as natural science. Gone is the view of a thermodynamic world economy, dominated by "natural resources" being turned to entropy and waste by human extraction and use. Once seen as a physical system tending toward exhaustion and decline, the world economy has clearly emerged as an intellectual system driven by knowledge.

The key fact of knowledge is that it is anti-entropic: it accumulates and compounds as it is used. Technological and scientific enterprise, so it turns out in the age of the quantum, generates gains in new learning and ideas that dwarf the loss of resources and dissipation of energy. The efforts that ended in writing $E=mc^2$ or inventing a design for a silicon compiler—or in spreading the message of a moral God—are not usefully analyzed in the images of entropy. To see the world primarily in terms of its waste prod-

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ucts is possibly the most perverse vision in the history of science. The history of ideas cannot be comprehended as an entropic cycle of the production and disposal of paper products.

The materialist superstition succumbs to an increasing recognition that the means of production in capitalism are not chiefly land, labor, and machines—things present in all economic systems—but emancipated human intelligence. Capitalism, supremely the mind-centered system, finds the driving force of its growth is innovation and discovery. In the age of the microcosm, value added shifts rapidly from the extraction, movement, manipulation, and exhaustion of matter to the creative accumulation of information and ideas.

At the heart of this progress is a bold human sacrifice. After centuries of struggle against the elements—human masses pushing and pulling on massive objects at the behest of armed rulers—man stopped hoarding gold and jewels, land and labor. He stopped trusting only the things he could touch and feel. He stopped believing only his eyes and ears. At last relinquishing slavery to the sensory world, he gained access to a higher power and truth. And all those other things are being added unto him.

Overthrowing the superstitions of materialism—of anthropomorphic physics, of triumphant entropy, of class conflict and exploitation, of national and tribal bigotry—modern man is injecting the universe with the germ of his intelligence, the spoor of his mind. Sloughing off every layer of macrocosmic apparatus, the computer will ultimately collapse to a pinhead that can respond to the human voice. In this form, human intelligence can be transmitted to any tool or appliance, to any part of our environment. Thus the triumph of the computer does not dehumanize the world; it makes our environment more human. We can overcome our alienation from things. We can escape our absorption in the trivialities of subsistence. We can rise to the larger challenges of life.

Giving up the superficial comforts of a human scale world, man moves to mindscale. In the image of his Creator, he exalts the truly human—and godlike—dimension of his greatest gift: his creativity. Giving up the material idols in his ken, he is gaining at last his promised dominion over the world and its creatures.

The key lessons of the era spring from an understanding of hierarchy and freedom. Just as the large integrated circuits at the heart of computers cannot be designed from the bottom up, just as evolution could not have occurred from the bottom up alone, the human mind cannot be understood without a clear comprehension of the hierarchical structure of the universe.

The central error of materialism is to subordinate a higher level of creative activity to a lower one: the dramas of human freedom to the determinations of lifeless and unintelligible monads of matter. Opening the atom to find a world of information, we discover that the inverted hierarchies of materialism are as false empirically as the ancient philosophers found them bankrupt logically. In the hierarchies of nature, the higher orders cannot be reduced to the sum of their parts.

The dream of physicists that by studying the structure of atoms we could comprehend the purpose of nature, and the dream of biologists that the study of evolution would reveal the meaning of life, have both proved false. In the same way, neither the physics nor the chemistry of DNA will explain the code of genetic information, any more than the analysis of ink will reveal the meaning of a word or phrase.

Here we can see how the computer reinforces rather than replaces the human mind. The usual materialist assumption is that the brain—the hardware—comes first and mind somehow emerges from it. But the computer offers a contrary example. The computer design itself is a software program and determines the structure of the electronic circuitry that constitutes the computer.

Knowing the location of every electronic charge and connection in either brain or computer gives scarcely a clue of its purpose. It is the human mind that brings meaning to the syntax of the machine, whether hardware, software, or wetware. The higher-level languages of software lend significance to the dumb electrons circulating through the system. But the language is still sterile until it is translated by the human consciousness. Neither brain nor computer could think without an embracing presence of mind.

Any lower level of existence finds meaning only in higher orders outside itself. Physics finds meaning largely in chemistry, chemistry in biology, biology in man, and man both in knowledge and culture and in that higher level of meaning ordained by God. The study of science is thrilling and rewarding on its own level and imparts new powers and technologies for action on higher levels. But movement up a hierarchy leads to domains of increasing freedom and dignity and spiritual fulfillment, not into a materialist or determinist trap.

The entire history of technology suggests a similar awakening to new powers and horizons, new freedoms and opportunities. The new age of intelligent machines will enhance and empower humanity, making possible new ventures into outer space and new insights into atomic structure. It will relieve man of much of his most onerous and unsatisfying work. It will extend his lifespan and enrich his perceptual reach. It will enlarge his freedom and his global command. It will diminish despots and exploiters. It may even improve music and philosophy.

By overthrowing matter, humanity will also be able to escape from the traps and compulsions of pleasure into a higher morality of spirit. The pleasure principle is the governing force of a physical determinism, whether in psychology, sociology, or economics. Physiologically defined, pleasure makes the materialist world go round. Optimizing for bodily pleasures, human beings can take their place in a determinist scheme. Believing in determinism, they can escape the burdens of a higher morality. But pleasure-seeking is entropy in social life. It leads to the notion that dissipation is the effect of happiness. By contrast, the exaltation of mind and spirit leads to a higher order of experience and a richer access of power than any of the forms of physical dominance and exploitation that pervade the precincts of material pleasure.

Matter is subordinate to mind and spirit and can only be comprehended by free men and women. As computers master new levels of the hierarchy of knowledge, human beings can also rise to new pinnacles of vision and power and discover new continents of higher truth. The computer will give mankind new vessels to rule the waves of possibility. Its promise can be betrayed only by the abandonment of the freedom and faith that made it possible.

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Hulton-Deutsch Collection/Corbis

Experiments with collectivized agriculture in the Soviet Union (pictured) and Maoist China took the lives of 50 million people.

The Conservative Critique of Social Engineering

BY DANIEL J. MAHONEY

The West began the twentieth century enamored of scientific progress—a.k.a. "man's mastery over nature"—and the comprehensive improvement, even the radical transformation, of society. Today, modern men and women have been chastened. We know that such progress comes with a price—and that it does not guarantee moral improvement.

The devastating consequences of man's hubris in our time, from the emergence of destructive technologies to the totalitarian goal of engineering society, rightly give us pause. We are led to ask, is there an unavoidable link between the hopes that modern man placed in the conquest of non-human nature on the one hand, and the totalitarian efforts to conquer or transform human nature on the other? What relationship holds between modern science and what Friedrich Hayek in *The Counter-revolution of Science* called "scientism"—the effort to apply the methods of mathematical physics and geometry to human nature? How scientific, in fact, are the aspirations for a science of society that could make "social engineering" possible?

Most conservatives now agree we should strive to improve man's lot through technological innovation and economic growth. Yet they remain skeptical about thrusting centralized planning on irreducibly complex societies. Conservatives don't reject reason outright but rather what the English political philosopher Michael Oakeshott called "rationalism in politics"—a style of politics that ignores the wisdom latent in tradition. Political rationalists don't foresee the unintended consequences of uprooting long-established institutions and social practices that have well-served human needs. This sort of rationalism forgets, too, that societies can best reform their evils by pursuing possibilities for improvement that already inhere in their established ways of life.

Conservatives, by contrast, have tended to support traditional ways of life and localism for their own sake. They know that a world dominated by aggressive rationalism is one that will have little room for personal independence or for the local color that gives life so much of its charm. There is a risk, though, that the conservative critique of rationalism will go too far and become a full-fledged critique of reason. It is best to say that reason itself shows the limits of reason and hence the dangers of scientism and social engineering.

Aristotle provides the first, and perhaps unsurpassed, rational critique of the misapplication of the rationalist spirit to human affairs. He carries out his critique of scientism in the name of both true science and healthy politics. In his *Ethics,* he reminds the party of reason that science must respect the imprecision built into its subject matter. The study of politics, for example, can never be as precise as geometry. In his *Politics,* he gently mocks the first systematic city planner, the eccentric Hippodamus of Miletus, who formulated a detailed plan for a mathematically ordered "best regime."

Aristotle reserves his harshest criticism for Hippodamus's advocacy of a law honoring those who discovered something new for the city—especially new laws. Aristotle does not deny that some political reform is good, precisely because old laws are sometimes foolish. But he also insists that law-abidingness depends upon habits that arise from deeply rooted customs; habits that the reckless pursuit of political change will surely undermine. Hippodamus characteristically divided everything—the population, laws, and land—into threes because he wrongly thought that human nature was amenable to mathematical manipulation. A true science of man, Aristotle coun-

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ters, takes its bearing from that mix of reason and passion, wisdom and custom, that is characteristic of human life.

In the spirit of Aristotle, conservatives are rightly skeptical of utopian politics. They deny that progress, however desirable, can ultimately transform human nature. They know that the most important initiatives for change and conservation come from below, from a vigorous, independent civil society. And above all, they fear the "experts" who think they know better than ordinary folks how to run their lives. More than liberals, they are aware of what C. S. Lewis famously observed in *The Abolition of Man:* "What we call Man's power over Nature turns out to be a power exercised by some men over other men with Nature as its instrument." Conservatives instead defend the good sense of ordinary people who are in touch with the stuff of life.

A brilliant new book, *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed,* beautifully articulates the case against social engineering. Its author, James C. Scott, is no political conservative but his is, nonetheless, a deeply conservative critique of what he calls "high modernist" ideology. High modernism distrusts local and practical knowledge and seeks to exchange the prudence of ordinary people for an administrative ordering of nature and society by experts. When linked to totalitarian collectivism, high modernism can lead to immense social disasters, such as the experiments with collectivizing agriculture in the Soviet Union and Maoist China that together took the lives of 50 million people.

When state intervention ignores the utility of long-established institutions, when planners "map" society in a way that abstracts from the real concerns and activities of ordinary people, when the state adopts a belligerent attitude toward those it sets out to help, modernization becomes an instrument of totalitarian manipulation and control. Lenin, for example, believed society could be controlled from the center with little or no input from the "administered." (He borrowed from the theories of the American efficiency expert Frederick Taylor and from the "war socialism" implemented in Germany during World War I.) With no place for the give and take of ordinary politics and economics, his revolutionary schemes had predictably perverse results. For example, collectivization prevented the Soviet Union from efficiently producing those elementary goods (fruits, vegetables, dairy products) that even the most "backward" agrarian societies had had little difficulty providing for their people. Scott shows that such authoritarian social engineering fundamentally misjudges the nature of man and society: Ordinary human beings are far too naturally independent, and society too diffuse and complex, to justify "scientific" intervention in every aspect of human life.

NOTHING IS LESS SCIENTIFIC THAN THE ILLUSION THAT THE HUMAN WORLD CAN BE BROUGHT UNDER SCIENTIFIC CONTROL.

As the Czech statesman Václav Havel has written, totalitarianism presents an extreme version of modern science's plan for the objective, rational control of the world. He notes modern science's deep distrust of common sense and ordinary experience: Modern science treats the common sense world of personal responsibility as a subjective realm unworthy of scientific respect. We should not be surprised, then, that politicians and ideologues imbued with its spirit seek to make society more "rational"—and thus more conducive to administrative control—through social engineering.

But our twentieth-century experience should have taught us that nothing is less scientific than the illusion that the human world can be brought under scientific control. And as the French political philosopher Pierre Manent has noted, there can be no true science of society without serious meditation on the nature, needs, and limits of the human soul.

THE PSEUDO-SCIENCE OF SOCIALISM

The majority of the intellectual leaders of the socialist movement...are socialists because socialism appears to them...as "science applied in clear awareness and with full insight to all fields of human activity."...

• • •

Compared with the work of the engineer that of the merchant is in a sense much more "social," that is, interwoven with the free activities of other people.... His special knowledge is almost entirely knowledge of particular circumstances of time or place.... But though this knowledge is not of a kind which can be formulated in generic propositions, or acquired once for all, and though in an age of Science it is for that reason regarded as knowledge of an inferior kind, it is for all practical purposes no less important than scientific knowledge.

• • •

...All we have said here is directed solely against a misuse of Science, not against the scientist in the special field where he is competent.... The main lesson at which we have arrived is indeed the same as that which one of the acutest students of scientific method has drawn..."the great lesson of humility which science teaches us, that we can never be omnipotent or omniscient, is the same as that of all great religions: man is not and never will be the god before whom he must bow down."

—F. A. Hayek, *The Counter-revolution of Science: Studies in the Abuse of Reason*

Let scientists tell us about sciences. But government involves questions about the good for man, and justice, and what things are worth having at what price; and on these a scientific training gives a man's opinion no added value.

• • •

If we are to be mothered, mother must know best.... In every age the men who want us under their thumb, if they have any sense, will put forward the particular pretension which the hopes and fears of that age render most potent. They "cash in." It has been magic, it has been Christianity. Now it will certainly be science....

Let us not be deceived by phrases about "Man taking charge of his own destiny." All that can really happen is that some men will take charge of the destiny of others.... The more completely we are planned the more powerful they will be.

—C. S. Lewis, "Willing Slaves of the Welfare State"

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Living in a Material World

By John G. West Jr.

How "Scientific" Materialism Eroded Freedom

"AN AGE OF SCIENCE IS NECESSARILY AN AGE OF MATERIALISM," science writer Hugh Elliot declared in 1919. His assertion sums up the intellectual revolution that had occurred by the early decades of this century. The revolution claimed that material conditions can wholly explain human beings and the universe they inhabit. ❦ This "scientific" materialism is dubious science and even shakier philosophy, but it had far-reaching consequences. For instance, English naturalist Charles Darwin supplied a seemingly persuasive theory of how man and his moral beliefs could be understood simply as the product of the "survival of the fittest." In Germany, Karl Marx contended that one's ideas are the product of economic conditions and that the class struggle is the manifestation of Darwin's theory in society. In America, psychologists like John Watson argued that the soul was a myth and reason was essentially brain chemistry. ❦ Such theories encouraged the growth of coercive utopianism at the expense of freedom.

The Disappearance of Freedom and Personal Responsibility

Scientific materialists allege that all human thoughts and actions are dictated by either biology or environment, an idea that leaves little room for freedom or personal responsibility. A few quotations show how this mindset has given birth to the modern culture of victimhood:

> [R]ecent medical researches...have proved in the case of many criminals, if not of all, that from the very first they have been, as it were, doomed or predestined to crime by a faulty or imperfect organization of mind and body.... Professor Benedikt holds madness and crime to be twins, and is of the opinion that no criminal acts to more than a very limited extent from his own moral freedom and self-control.... The same conclusion has been arrived at by Dr. Bordier of Paris....
>
> "Hence," says G. Forster, "we should do best in neither judging nor condemning anyone."
>
> —**Ludwig Buchner, a leading German Darwinist, writing in *Force and Matter, or Principles of the Natural Order of the Universe* (4th English edition, 1891).**

The grotesque notion of a private *entity*, spirit, soul, will, conscience or consciousness, interfering with the orderly processes of body mechanisms is invalidated by physiological and neurological science....

Man is no more "responsible" for becoming wilful and committing a crime than the flower for becoming red and fragrant. In both instances the end products are predetermined by the nature of protoplasm and the chance of circumstances.

—**Nathaniel Cantor, University of Buffalo, *Crime: Criminals and Criminal Justice* (1932).**

Science is at work, humanity has been at work, scholarship has been at work, and intelligent people now know that every human being is the product of endless heredity back of him and the infinite environment around him....

Do you mean to tell me that Dickie Loeb had any more to do with his making than any other product of heredity that is born upon the earth?

...If there is any responsibility anywhere, it is back of him; somewhere in the infinite number of his ancestors, or in his surroundings, or in both.

—**attorney Clarence Darrow, defending kidnapper and murderer Dickie Loeb in the infamous Leopold-Loeb murder trial, 1924. Darrow's defense spared the two men from the death penalty.**

Few informed people...can any longer ignore the fact that many kinds of even serious wrongdoing which folklore claimed to be a result of someone's "bad choice" are actually the result of forces over which the individual has no control and often not even any awareness. He may, nevertheless, retain the illusion of choice... because it is comforting so to think and there is a cultural expectation to that effect. Yet the scientific evidence already is adequate to demonstrate that there was no real choice.

—**John Cuber, Ohio State University, *Sociology: A Synopsis of Principles* (5th edition, 1963).**

Current psychiatric opinion...holds that mental illness often leaves the individual's intellectual understanding relatively unimpaired, but so affects his emotions or reason that he is unable to prevent himself from committing the act.... An insane person may therefore often know the nature and quality of his act, and that it is wrong and forbidden by law, and yet commit it as a result of the mental disease.

—***People* v. *Drew***
(California Supreme Court, 1978)

Opponents of determinism defend a position called free will, a difficult view to describe. To some extent it is merely a rejection of determinism,

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claiming that people sometimes make decisions not controlled by their genetics, their past experiences, or their environment. But what is left besides genetics and environment?

—James Kalat, *Introduction to Psychology* (4th edition, 1996)

If all your classmates had been reared in identical environments, any differences between you and them would necessarily be due to genetics. Conversely, if all your classmates had come from the same fertilized egg but were subsequently raised in different environments, any difference in their personal characteristics would necessarily be due only to the environment.

—Neil R. Carlson and William Buskiest, *Psychology: The Science of Behavior* (5th edition, 1997).

Killing your baby. What could be more depraved? ...But every year, hundreds of women...kill their newborns or let them die...

How could they do it?...

Martin Daly and Margo Wilson, both psychologists, argue that a capacity for neonaticide is built into the biological design of our parental emotions.... Parental investment is a limited resource, and mammalian mothers must "decide" whether to allot it to their newborn or to their current and future offspring. If a newborn is sickly, or its survival is not promising, they may cut their losses....

[T]he emotional circuitry of mothers has evolved to cope with this uncertain process, so the baby killers turn out to be not moral monsters but nice, normal (and sometimes religious) young women.

—Steven Pinker, professor of psychology at MIT, "Why They Kill Their Newborns," *The New York Times Magazine* (November 2, 1997).

The Rise of Coercive Utopianism

A second legacy of materialism is coercive utopianism. Claiming either that they were the servants of the forces of materialism—or that they could overcome materialism by a sheer act of will—zealots tried to create utopias in Russia and Germany. In America, significant parts of the cultural elite began to believe that we could engineer the perfect society through eugenics—"scientific" human breeding. As the following quotations show, scientific materialism was used to justify these tyrannical efforts.

With savages, the weak in body or mind are soon eliminated; and those that survive commonly exhibit a vigorous state of health. We civilised men, on the other hand, do our utmost to check the process of elimination; we build asylums for the imbecile, the maimed, and the sick.... Thus the weak members of civilised societies propagate their kind. No one who has attended to the breeding of domestic animals will doubt that this must be highly injurious to the race of man. It is surprising how soon a want of care, or care wrongly directed, leads to the degeneration of a domestic race; but excepting in the case of man himself, hardly any one is so ignorant as to allow his worst animals to breed.

—Charles Darwin, *The Descent of Man* (1871).

Although it is developed in the crude English style...[Darwin's *The Origin of Species*] contains the basis in natural history for our view.

—Karl Marx to Friedrich Engels (December, 1860).

The chief of [Marx's advances in philosophical materialism]...is dialectics... the doctrine of the relativity of human knowledge, which provides us with a reflection of eternally developing matter....

Marx's philosophical materialism has alone shown the proletariat the way out of the spiritual slavery in which all oppressed classes have hitherto languished.

—V. I. Lenin, "The Three Sources and Three Component Parts of Marxism" (1913).

The belief that man has been slowly developed from some ape-like progenitor came toward the close of the last century to be nearly universally held by thoughtful persons; this belief gave rise to a new hope that this upward march of mankind might be continued in the future.... But science, whilst giving us good grounds for hope, also issues a grave warning concerning the danger of national deterioration resulting from the unchecked multiplication of inferior types.

—Leonard Darwin, grandson of Charles, to the International Congress of Eugenics (1921)

...It has become apparent that whole masses of human population are, as a whole, inferior in their claim upon the future to other masses, that they cannot be given opportunities or trusted with power as the superior peoples are trusted, that their characteristic weaknesses are contagious and detrimental in the civilising fabric, and that their range of incapacity tempts and demoralizes the strong. To give them equality is to sink to their level, to protect and cherish them is to be swamped in their fecundity.

—H. G. Wells, *Anticipations and Other Papers* (1902).

No more than Nature desires the mating of weaker with stronger individuals, even less does she desire the blending of a higher and a lower race, since, if she did, her whole work of higher breeding, over perhaps hundreds of thousands of years, might be ruined with one blow.

—Adolf Hitler, *Mein Kampf* (1924).

It is better for all the world if, instead of waiting to execute the degenerate offspring for crime or to let them starve for their imbecility, society can prevent those who are manifestly unfit from continuing their kind. The principle that sustains compulsory vaccination is broad enough to cover cutting the Fallopian tubes.... Three generations of imbeciles are enough.

—Supreme Court Justice Oliver Wendell Holmes, writing in defense of forced sterilization laws in *Buck* v. *Bell* (1927).

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ALIENS IN THE COSMOS

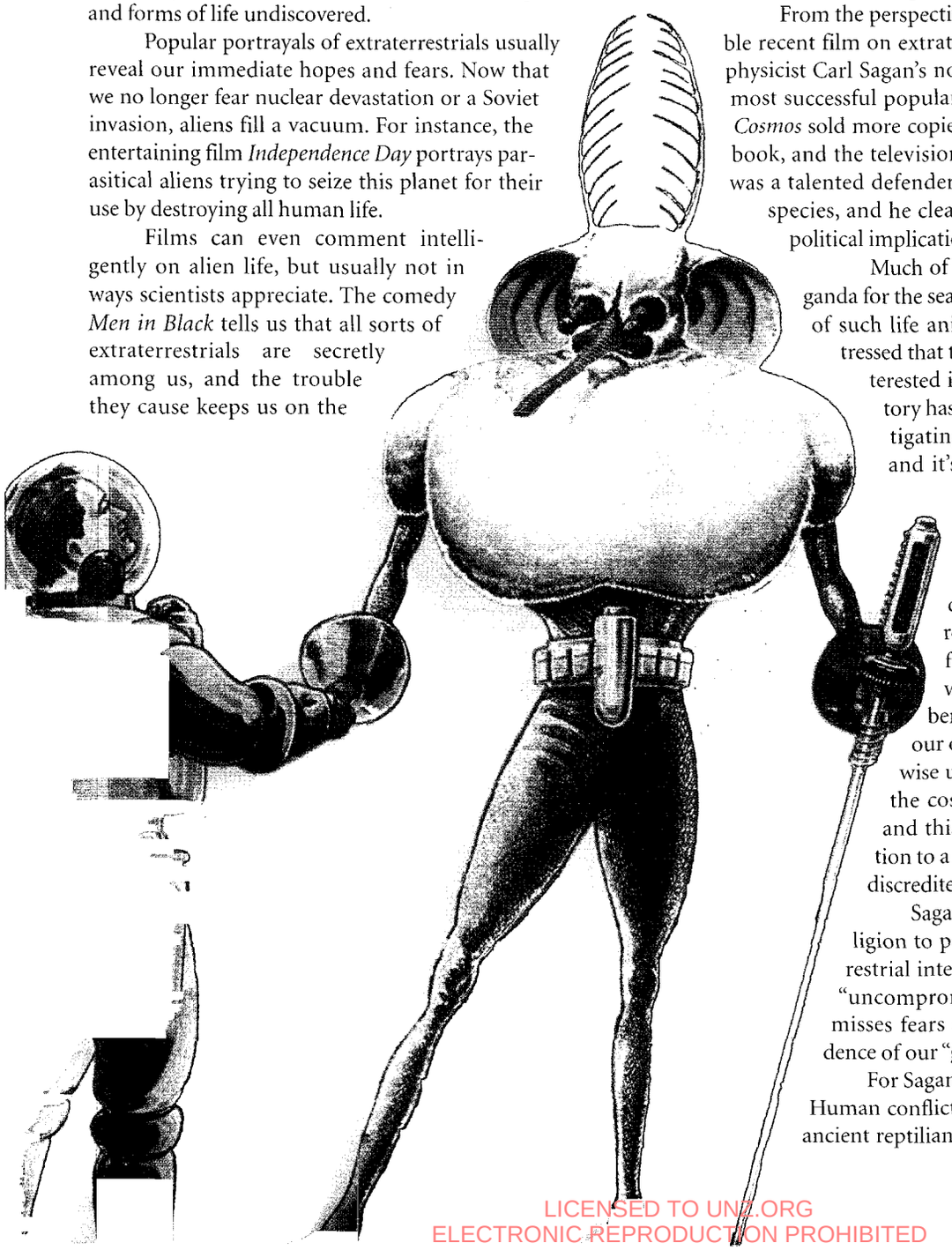
OR, THE CURIOUS AFFAIR OF CARL SAGAN AND E.T

By Peter Augustine Lawler

Humans cannot help but hope and fear, and we clearly have longings that elude earthly satisfaction. With the decline of belief in a providential God, our attention remains fixed on the sky, but less on a heaven unseen than on planets and forms of life undiscovered.

Popular portrayals of extraterrestrials usually reveal our immediate hopes and fears. Now that we no longer fear nuclear devastation or a Soviet invasion, aliens fill a vacuum. For instance, the entertaining film *Independence Day* portrays parasitical aliens trying to seize this planet for their use by destroying all human life.

Films can even comment intelligently on alien life, but usually not in ways scientists appreciate. The comedy *Men in Black* tells us that all sorts of extraterrestrials are secretly among us, and the trouble they cause keeps us on the brink of planetary destruction. They are fended off by a secret corps of government agents, who comb the tabloids for signs of trouble. We learn that extraterrestrials are as strange and perverse as we are, though more technologically advanced.



From the perspective of serious scientists, the most credible recent film on extraterrestrial life is *Contact*, based on the physicist Carl Sagan's novel of the same name. Sagan was the most successful popularizing scientist of our time. His book *Cosmos* sold more copies in America than any other scientific book, and the television series was equally well received. He was a talented defender of the typical scientist's view of our species, and he clearly articulated that view's moral and political implications.

Much of Sagan's writing was unabashed propaganda for the search for extraterrestrials. The possibility of such life animated his curiosity, and he was distressed that the American government was so uninterested in it: "Every civilization in human history has devoted some of its resources to investigating deep questions about the Universe, and it's hard to think of a deeper one than whether we are alone."

Even more than the book, *Contact* the film (written by Sagan and his wife) appeals to this quasi-religious dimension of our search for extraterrestrial intelligence. It presents the comforting picture of advanced beings watching over us and gradually and benevolently intervening in our affairs for our own good. Through this contact, otherwise unknowable secrets about the nature of the cosmos are revealed to a human being, and this revelation somehow brings inspiration to a world searching for meaning to replace discredited biblical religion.

Sagan uses the image of God in biblical religion to promote his opinion that any extraterrestrial intelligence we might contact would have "uncompromisingly benign" intentions. He dismisses fears about extraterrestrial contact as evidence of our "guilty conscience" about our history.

For Sagan, both technology and morality evolve. Human conflict and injustice are rooted in "the deep, ancient reptilian part of the brain," and human history

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For the last 300 years, scientists have marginalized the place of human beings in, and so alienated them from, the universe in which they live.

is the movement away from being a reptile and toward living scientifically and cooperatively, from pure body to pure mind. All forms of intelligent life become less passionate and violent over time. The only glitch in this process is that moral evolution sometimes lags behind technological development. So the extraterrestrials may aid us in moral evolution, saving us from ourselves.

Of course, this conclusion is not self-evident. Our technology and morality are rooted in specific features of our human nature and our earthly environment. We have trouble living well with the fact of death, in part because our bodies are so vulnerable but also because we're so conscious of our bodily limitations. We experience ourselves as individuals. Our personal morality is rooted in the fact that we reproduce sexually and our young take a long time to become independent. Our passions are a complex mixture of self-consciousness, sociality, and bodily impulse.

Possibly extraterrestrials could show us how to overcome technologically some of the present limitations of being human. Neither they nor we could become immortal, however, because we know enough to know for certain that neither life nor the cosmos itself will exist in its present form forever. Perhaps they can show us how to postpone death indefinitely and make accidental death much less likely.

But would that be moral progress? Would we be happier as a result? The increased human security that technology has so far brought has not freed human beings from fear. Instead, human life has become more fearful as death comes to seem less necessary and more accidental. And we usually identify spiritual progress with living well with the threat of death, not overcoming it with science.

Wouldn't the pushing back of death also lead to a reduction in love? Would our alien teachers really understand how fundamental and precious love is for human beings? Love is a compensation, and for many, at least, a more than adequate compensation, for death.

Sagan doesn't confront these questions in *Contact*. The advanced extraterrestrials he describes are loving beings, and they make their human visitor aware of how little she has loved or made genuine contact with her fellow human beings. There's even

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Significance and Insignificance

"The whole picture of the universe which science has given us makes it such rot to believe that the Power at the back of it all could be interested in us tiny little creatures crawling about on an unimportant planet! It was all so obviously invented by people who believed in a flat Earth with the stars only a mile or two away."

"When did people believe that?"

"Why, all those old Christian chaps...Boethius and Augustine and Thomas Aquinas and Dante."

"Sorry," said I, "but this is one of the few subjects I do know something about.... You see this book," I said, "Ptolemy's *Almagest*. You know what it is?"

"Yes," said he. "It's the standard astronomical handbook used all through the Middle Ages."

"Well, just read that," said I, pointing to Book I, chapter 5.

"The Earth...in relation to the distance of the fixed stars, has no appreciable size."...

"Did they really know that *then?*" said my friend. "But—but none of the histories of science—none of the modern encyclopedias—ever mention the fact."

"Exactly," said I. "I'll leave you to think out the reason. It almost looks as if someone was anxious to hush it up, doesn't it?

—C. S. Lewis, "Religion and Science"

You, who read this, are the target of observation from a hundred different angles. You are like a celebrity landing in a foreign country, surrounded by camera-men. To the statistician...you are one unit in a crowd. To the physicist, you are a mathematical formula, to the chemist a compound of substances, to the biologist a specimen. The behaviourist sees you as an animal modified by conditioned reflexes; the psychologist as a mental type suffering, to a more or less degree, from morbid variations; the philosopher, as the subject of a conscious experience. You interest the historian as one of the innumerable insects that build up the coral island of human development; the economist, as bee or drone that helps to cross-fertilise the cycle of production and consumption. To the postman, you are an address...to the politician, a voter; to the revenue, a tax-payer.

You are surrounded by specialists, each of whom invites you to take a look at yourself down his own particular microscope.... Each science catches man from one particular angle and makes a fool of him, like the snapshot which gives you your portrait arrested in midwalk....

But there is another side to the picture. Ask yourself for a moment why it is that all these observers are concentrating their various spotlights on *you,* and it will give food for more comforting reflections. Whether or no Man is heir to all the ages, he is certainly the common target of all the -ologies. Man alone has a finger in every pie, challenges the attention, at long last, even of the astronomer. How significant a being we must pronounce him, after all, this focus in whom so many rays meet! ...The fact is, each separate spotlight only catches one facet of your external relations; the inner core of you is something beyond their cognisance.

So significant you are, so universally relevant. But how, and by what right? Beware of asking; that way lies theology.

— Ronald Knox, *Stimuli*

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the suggestion that all intelligent beings experience cosmic loneliness or alienation, and so they all need each other. But it is unclear how the extraterrestrials live well with their mortality, and their love seems disembodied. They seem so angelic or passionless that we do not see them as flawed mortals. They are devoid of suffering and unrealistically benign—and so quite boring.

There's more than a hint in Sagan's writing that this tale of alien benevolence is a lullaby sung in the service of science. Sagan really believes the moral lesson of science is human insignificance. Human beings unscientifically crave privilege and uniqueness. We "primates" are instinctually ethnocentric, passionately devoted to our particular group, viewing others with hostility. We cling to the belief that we are at the center of the cosmos, made in God's image, or at least are the only intelligent beings in the cosmos.

Sagan thinks each advance of science has demoted man, teaching him humility and so improving him morally. The plies, Davies notes, that if the evolutionary process repeated itself any number of times, the same accident would not happen again. But that dogma contradicts the physicists' own experience. Davies explains that there really is a "hidden order" to the universe, and physicists have been able to express it mathematically. He goes on to observe that all contemporary physicists (including Sagan, of course) know that the human mind is fitted to "crack this cosmic code." Then he notices that this capability has "no obvious survival value, from an evolutionary point of view." Being able to express the truth about the whole is not part of the practical knowledge that helps our species survive. That capability is, however, evidence the human mind is somehow at home in the cosmos, giving "us cause to believe that we, in our humble way, are part of a larger, majestic process of cosmic self-knowledge."

A more comprehensive critic of Sagan is the philosopher-scientist-novelist Walker Percy. His *Lost in the Cosmos* is a correction, both playful and serious, of Sagan's earnest *Cosmos*. Percy

Sagan's aliens are angelic and passionless. They are devoid of suffering and unrealistically benign—and so quite boring.

Earth is a "pale blue dot" nowhere in particular in the cosmos. Human beings are no different in kind from chimps. The discovery of extraterrestrial intelligence will show that our intelligence is nothing special and that our biblical religion is untrue. The universe was not made for us, and, contrary to our hopeful longings, our existence has no purpose. Sagan says he agrees with Tolstoy: "The meaningless absurdity of life is the only incontestable knowledge available to man."

So finally Sagan does not contend that the discovery of extraterrestrial intelligence will teach him anything new. It will only confirm the truth of the tale told by modern science of "a cold, immense, indifferent Universe in which humans are relegated to obscurity." The popularization of that awareness, Sagan naively believes, will bring all ethnocentrism and human conflict to an end.

Cosmic indifference to our puny existence need not be a cause for despair. Sagan says, in effect, that all human beings should follow the example of the physicist and avert their eyes from themselves and toward the cosmos. He anticipates "the emergence in our consciousness of a Universe of a magnificence, and an intricate, elegant order, beyond anything our ancestors imagined." Of course, from this perspective neither extraterrestrials nor humans are worthy of curiosity or love.

In *Are We Alone?* Sagan's fellow physicist Paul Davies criticizes this view of human and extraterrestrial intelligence. Davies emphasizes that Sagan's views are a rehash of "the dominant scientific paradigm since the time of Newton," which by insisting the world contains no natural ends or purposes has led us to "bleak and depressing conclusions about our place in the universe." For the last 300 years, scientists have marginalized the place of human beings in, and so alienated them from, the universe in which they live.

The idea that the embodied consciousness of human beings is a quirky accident is still the dogma of biologists. It im-

agrees with Davies that Sagan's account of the cosmos abstracts from the scientist's own experience. That experience includes the joy of understanding, but also the misery of alienation. The physicist's mathematical account of cosmic order excludes the often perverse and rather disordered experiences of the self-conscious mortal. Human beings, Percy observes, are both connected to the cosmos and somehow lost in it. The man who comprehends all the physical universe but not his own human self or soul experiences himself as a mysterious exception to the cosmic order. Yet our inability to escape experiencing ourselves as self-aware individuals is the best evidence of our dignity.

So Percy is capable of asking: "Why is Carl Sagan so lonely?" His strange search for extraterrestrial life cannot be explained by scientific curiosity alone. For the most curious thing in the cosmos is the human being, Earth's resident alien. Sagan himself is an alien and won't admit it. His diversion of thought away from the human soul and toward the cosmos is a form of self-denial. For him, science is more diversion from than a search for the truth.

The discovery of extraterrestrials won't give Sagan the help he really needs. If the extraterrestrials are highly intelligent and benignly untroubled, Percy explains, they'll stay away from us, because they'll know we're "born to trouble." But being self-conscious and mortal, with desires and longings that cannot be accounted for by the requirements of self-preservation, they'll probably be as screwed up as we are. So they'll be curious and murderous, loving and hateful, truth-tellers and liars.

Percy concludes it's unlikely other aliens will tell us anything about ourselves we can't discover through the old-fashioned search for self-knowledge. Nor will they make our biblical religion more or less credible than it is now. They'll need help they can't provide for themselves just as much as we do, and they'll have longings, particularly for love, that only a personal God can satisfy completely. And they won't be able to tell us for sure whether or not such a God exists.

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The Science of

Medicine for Body & Soul

He practices medicine at perhaps the nation's top hospital and is internationally renowned for his development of an operation that allows men whose prostates are removed to retain sexual function. But a key component of the care that urologist Patrick Walsh provides patients has little to do with the latest information garnered from medical journals, conferences, or his colleagues at Johns Hopkins Hospital. Indeed, when Dr. Walsh talks to patients about a higher authority, he doesn't mean the *New England Journal of Medicine* editorial board.

When Walsh makes his hospital rounds, the seemingly distinct, even opposite, worlds of medicine and religion coalesce. Convinced that his patients require attention to the spiritual as much as the physical, Walsh ever so gently asks if they believe in God.

"I'm solidly grounded in my own [Catholic] faith. When I'm sick I turn to my own faith," Walsh says. "I feel there is no more appropriate time to have those discussions" than when patients are sick.

The conventional wisdom is that doctors don't pray for anything but a hole in one on the golf course, or that their patients' checks will clear. But whether it's doctors who pray with their patients or simply inquire as to their religious beliefs, physicians have in recent years grown amenable to the notion that prayer is good medicine.

Say two Hail Marys and call me in the morning? Not quite. Doctors like Walsh are not, well, Christian Scientists. Rather, as the literature on the subject piles up, they've come to understand that religion is often an important factor in patients' health. More than 200 studies have shown that religion is beneficial to mental and physical health; it correlates with lower rates of everything from depression and drug addiction to heart disease.

At small town hospitals as well as big name medical schools, a revolution may be underway. In William Beaumont Hospital outside Detroit, for example, the traditional medicine/religion divide has narrowed considerably. Pastoral care is now standard for the oncology department, and requests for pastoral assistance from other departments have increased in recent years. The men in white now work hand in hand with the men in black.

As Michael Maddens, director of geriatric medicine at William Beaumont explained to the *Detroit News*, "It's about hope, and we haven't found a way yet to put hope in a bottle. I certainly don't write out a prescription that says, 'Go to prayer meetings.' But if somebody has a sense of spirituality, I do encourage them to pray."

Sometimes, the new focus on religion just means listening to patients a bit closer—and taking cues from them, a daunting challenge for doctors with pretensions of omniscience, but probably good for the profession. Iris Keys, a Baltimore internist and ordained minister, says that "Believers have buzzwords. They drop the word, and I respond." Other times, she initiates the discussion. "I'm not pushy. You lay it out there," said Keys, who often prays with patients. She says no patient has ever taken offense at her entreaties.

Although she's always been religious, Dr. Keys didn't envision her overlapping roles when she embarked upon a medical career. In 1984, Keys, then 40, quit her job as a nurse to attend medical school because she felt "that was what God wanted me

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BY EVAN GAHR

to do." But she planned an entirely secular medical career—until she inadvertently began to witness the power of prayer.

For example, early in her practice, Keys' patient Rosalie Jones was hospitalized for inflammation of the gall bladder. Doctors said she would die without surgery. But Jones, a minister's widow, declined. Instead, she simply asked that others pray for her. And made such a speedy recovery that she went home three weeks later.

(Some eight years later, Jones seems quite healthy and feisty. She answered the phone with a resolute voice when *TAE* called. The moment an interview was requested she hung up.)

If Dr. Keys has simply reacted to what she has seen with her own eyes, many of her colleagues have done their best to look the other way. Dr. David Larson, director of the private National Institute for Healthcare Research, says that medical studies long obscured the effect of prayer on health, hiding prayer amidst many other factors and rarely considering it separately.

Larson, a Duke University-trained psychiatrist and a National Institutes of Health-trained epidemiologist, says prayer got short shrift until the mid-1980s. The amount of research that has emerged since then, some of it done by Larson, seems sufficient to make even devout atheists believers in the power of prayer. It's also worth noting that these studies involve traditional prayer and religious practices, not any flaky spin-offs of New Age philosophy, holistic techniques, etc. In other words, when religion is deemed good medicine, researchers generally aren't talking about people who sit cross-legged on the floor and give thanks to Mother Earth.

Perhaps because the studies involved traditional religion, as opposed to warm and fuzzy spirituality, they were a little hard for the medical profession to swallow at first. Nevertheless, the sheer volume of the results are astounding. Consider:

◦ The *Journal of the American Medical Association* recently noted that more than 200 studies cite religious factors in patient treatment. "Statistically significant associations between religious belief and health measures…have appeared in studies of many diseases, [including] heart disease, hypertension, stroke, cancer, and gastrointestinal disease."

◦ Religious belief was a prime factor in the survival rate of 232 patients, according to a 1995 study by Dartmouth Medical School. For example, six months after surgery, non-believers had a death rate three times higher than believers. Of the 37 percent of patients who called themselves deeply religious, all had survived to that point.

◦ A 1996 Duke University study found that depression rates were 50 percent lower among elderly who were churchgoers than among those who didn't go.

◦ Even chaplain visits make a big difference, a study of 600 heart surgery patients at a Massachusetts veterans' hospital found. One group of patients spent an hour each day with chaplains; the other group simply had standard visits of some three minutes. Patients who spent the greater time with chaplains were released from the hospital an average of three days earlier than those who had standard visits.

◦ In 1988, San Francisco cardiologist Randolph Byrd studied how prayer affected 393 coronary-care patients. Half the group were prayed for by born-again Christians (although none of the patients knew who was being prayed for). Those who were prayed for had far fewer complications.

◦ Lisa Miller, a Columbia University clinical psychologist has conducted extensive research on the effect of religion on children and adolescents. The results are staggering: Children with religious mothers are 50 percent less likely to become depressed. Those raised in religious households are also significantly less likely to become addicted to drugs.

Nevertheless, change comes slowly in a profession that by its very nature is exceedingly cautious. Moreover, God could provide some stiff competition for doctors. As the old joke goes, the difference between God and doctors is that God doesn't think He's a doctor.

Still, as the evidence mounts, ignoring religion seems—to borrow a charge often leveled at religious folks—irrational. Doctors, after all, are familiar with the most intimate details of their patients' lives. Why should only religion be off-limits to someone to whom you are expected to bare all, literally and figuratively? Moreover, in the fiercely competitive age of managed care, when patients resemble customers and doctors shopkeepers, there could be a financial incentive for doctors to take religion seriously: Patients want it.

Recent surveys have found that some two-thirds of patients believe it's entirely appropriate for doctors to discuss their faith, and even pray with them if asked. But only 10 percent of respondents in one survey said doctors discussed such matters.

No wonder that Dr. Larson, a liberal-minded Episcopalian, is so determined to lift what he deems medicine's taboo against religion. His institute holds conferences on the research that demonstrates the connection between prayer and health. It has also provided seed money for the development of numerous courses on the subject. Forty out of the nation's 126 medical schools now offer courses on some variant of religion and health. They run the gamut from religion's role in "the emergence, historical evolution and contemporary identity of the medical profession and the delivery of health care" to "how the human spirit faces long-term illness, chronic pain and the process of dying."

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A subject that was once ignored in medical schools, or hidden in ethics classes, is now treated with a measure of seriousness and respect. "The next generation sees spirituality as a relevant factor," Larson says.

Yet even among the current generation there's more receptivity to religion than is generally realized. In 1996, nearly 99 percent of family physicians surveyed said spirituality contributes to health.

Perhaps the most dramatic example of the growing, albeit somewhat uneasy alliance, between medicine and religion can be found among psychiatrists. This is, after all, a profession whose founding father Sigmund Freud deemed religion something of a neurosis. Religious figures, of course, have over the years returned the favor. In 1947, Bishop Fulton J. Sheen, the Catholic priest turned television sensation, denounced psychoanalysis for its "materialism, hedonism [and] eroticism."

The hostility continued through the '60s and the '70s among psychiatrists, as well as other members of the mental health profession. According to Dr. Larson, until the early 1980s, a standard personality test, the MMPI, had a marked bias against religious belief. Answering yes to "do you believe in the second coming of Christ?" was deemed problematic, belief in God indicative of low self-esteem.

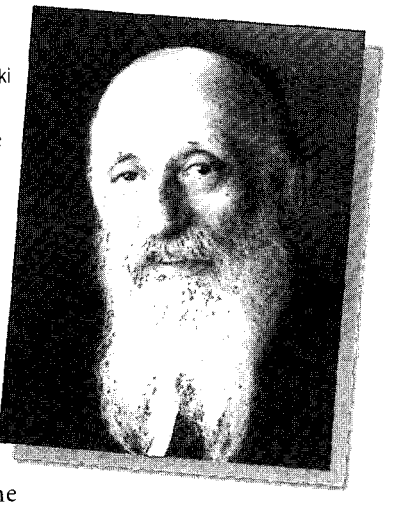
But as the influence of classical Freudian analysts waned, the profession warmed to religion. The American Psychiatric Association (APA) issued guidelines in 1990 that psychiatrists "should maintain respect for their patients' beliefs." Last year, the APA 's *Diagnostic and Statistical Manual of Mental Disorders* added a new category, "religious or spiritual problem," which recognizes religious belief or experience as entirely normal.

Today religious-minded psychiatrists don't have to feel like heretics. And secular colleagues are more open to their ideas. "It's not like, 'Oh s---, here comes religion,'" says Larson.

The détente has occurred on a number of fronts. At the most superficial level, many psychologists recognize that they'd be foolish to ignore their patients' religious concerns, or dismiss them as some sort of personality disorder rooted in a repressive childhood.

Lisa Miller, the Columbia University psychologist who studied the links between depression and religious practices and is herself a religious Jew, says her patients—mostly Catholic adolescents—pick up that she's "comfortable with religion."

While Miller listens, others integrate, because they think psychiatry is virtually useless without some kind of bedrock moral foundation that religion provides. Lewis Andrews, a research psychologist who has also done clinical work, was trained by the high priests of secular psychology but gradually became disillusioned. Psychology, he found, was ultimately a deterministic philosophy that didn't allow any room for free will. Instead, shrinks assumed that childhood could entirely predict adult behavior. That's the debilitating message that "functioning neurotics" got from their would-be saviors. "Psychology doesn't address the question: Do we have free will? I believe there's a God and you have to live according to values or you'll get in trouble." Emotional problems occur when one tries "to live from a material perspective."



Doctor, and Rabbi, Abraham Twerski

Many have tried to fuse the two approaches. For example, the Pasadena, California-based Fuller Theological Seminary offers a Ph.D. in clinical psychology. Numerous churches now offer their own counseling centers, and both Orthodox Jewish mental health professionals and Christian counselors have their own organizations. The Center for the Study of Psychology and Tradition in Ottawa even explores what Dr. Andrews calls the "therapeutic lessons of Judaism."

Abraham Twerski, a rabbi and psychiatrist who founded the acclaimed Gateway Rehabilitation Center with a Catholic nun, has straddled both sides of the wall for quite some time. Born in Milwaukee in the 1930s, the son of a famous Hasidic rabbi, Twerski went to medical school in part because he found that the roles clergy had played were being overtaken by psychiatry, with therapists serving as confidantes and counselors. He attended medical school when religion and psychiatry were at odds, and was even asked at an interview how an Orthodox Jew could possible be a psychiatrist.

He got the job, however. And patients have been a lot less judgmental in his career once they get over the "shock effect" of finding that their shrink has not just a beard, which is to be expected, but a long white one, along with standard Hasidic garb.

After working at a Catholic hospital, Twerski founded Gateway in 1983. Located in suburban Pittsburgh, it now ranks among the top 12 drug and alcohol treatments centers in the United States, according to a *Forbes* survey. What makes it different? How can folks tell that it's run by an Orthodox rabbi? Twerski jokes that it's not tough after people see the huge picture of him at the entrance. "The only thing they don't do is genuflect."

More seriously, he says that the center focuses on "spirituality with or without religion." And without spirituality, it's exceedingly hard for addicts to throw the monkey off their backs once and for all. "You can get off but are likely to relapse: For lasting recovery you must have a change in lifestyle. Those features which separate humans from animals are spiritual." To recover from addiction, "you're throwing away some of the need for self-gratification; you're being less self-centered; you've become more spiritual [by] definition."

The author of nearly 20 books, Twerski attributes the growing accommodation between religion and medicine to an understanding that rationality alone is insufficient. Citing the countless diseases that have been eliminated since his childhood, when polio for example was a constant threat, he says, "You have to think. What is there left that science and technology can do? They've reached their limit. And here I am taking people off cocaine and heroin. Science won't bring happiness."

Kevin R. Cooke/Graule Studio

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Can a Scientist believe in God?

BY BRENDAN MINITER

Can a scientist believe in God? "Absolutely. And recent surveys indicate that about 40 percent do," Francis Collins, co-director of the team to locate the gene for cystic fibrosis told *TAE*. But for many scientists, answering that question can break a career. Take Dr. Dean Kenyon for example. He earned an S.B. in physics from the University of Chicago (Phi Beta Kappa) and a Ph.D. in biophysics from Stanford. He was a National Science Foundation Postdoctoral Fellow at the University of California, Berkeley; a visiting scholar at Oxford; and a postdoctoral fellow at NASA-Ames Research Center. Since the publication of the book he co-wrote, *Biochemical Predestination,* he has been an authority in chemical evolutionary theory. But one semester at San Francisco State University, he included 3 lectures (out of 27) on the Bible and the origins of life, for which he was removed from teaching introductory lecture courses. Only under pressure from the university's Academic Freedom Committee, the Academic Senate, and the American Association of University Professors was Kenyon reinstated.

He is not alone. "The standard assumption [in today's academies] is that anyone who has faith has gone soft in the head," said Collins. "I encountered plenty of people who were puzzled by my beliefs, and a few who were honest enough to say they thought such beliefs were the mark of sentimentality or superstitions," he said.

The scientific community should recall that most of the founders of modern science believed in God, albeit often unconventionally. To Copernicus, Kepler, Newton, Boyle, Bacon, Pasteur, and Einstein, science was not simply contradictory to religion.

Nicolaus Copernicus (1473-1543) developed the theory that the sun was at the center of the universe and the Earth spins on its axis. He believed his model of the universe demonstrated the wisdom of God's layout: "At rest in the middle of everything is the sun. For in this most beautiful temple, who would place this lamp in another or better position?"

Johannes Kepler (1571-1630) carried on Copernicus's work and calculated the orbit of the planets. Kepler began his studies with the intention of becoming a theologian but switched to astronomy when he realized Copernicus was right about the placement of the sun. "I believe this," Kepler noted, "because I have constantly prayed to God that I might succeed if what Copernicus had said was true." "For a long time I wanted to become a theologian," Kepler wrote to a friend, "for a long time I was restless. Now, however, behold how through my effort God is being celebrated through astronomy."

To Kepler, the mechanics of nature did not negate God; rather they were His tune in a grand melody. "Man can play through," Kepler wrote about the mechanics of nature, to "the delight of God, the Supreme Artist, by calling forth that very sweet pleasure of the music that imitates God." Kepler even compared his discoveries to the birth of Christ. "I am writing the book—to be read now or by posterity, it matters not. It can wait a century for a reader, as God himself has waited 6,000 years for a witness."

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Sir Isaac Newton (1642-1727) formulated the laws of gravity and motion and the elements of differential calculus, and found no contradiction between faith and science. He thought science's scope should be limited to the provable: "We are to admit no more causes of natural things than such as are both true and sufficient to explain their appearances." Newton, who lived before philosophy and science split into two disciplines, believed scientists should follow empirical evidence and not be afraid to see the hand of God in their conclusions. "All sound and true philosophy is founded on the appearance of things; and if this phenomena inevitably draws us against our wills, to such principles as most clearly manifest to us the most excellent council and supreme dominion of the All-Wise and Almighty Being, they are not therefore to be laid aside because some men may perhaps dislike them." Nor did Newton believe that scientists could find a place in time or in nature devoid of God: "He endures forever; and is present everywhere, by existing always and everywhere, He constitutes duration and space."

Religious-minded founders of modern science were not limited to physics and astronomy. Robert Boyle (1627-1691), the founder of modern chemistry, began every day with a prayer and spent all of his income from lands in Ireland as a good Christian (two-thirds went to help the poor and support the Protestant church, one-third to spreading Christianity among American Indians). Boyle devoted many of his later writings to arguing that modern science was not atheistic, nor would mechanics replace God. He was in awe of the beauty of nature: "When I study the book of nature...I find myself often times reduced to exclaim with the psalmist, 'How manifold are thy works, O Lord, in wisdom hast thou made them all!'"

Contrary to modern belief, Boyle found science enhanced the glory of God, and he believed the pursuit of science would even increase religious convictions: "Reason when assisted by revelation may enable a man to discover far more excellencies in God and perceive them, than he contemplated before, far greater and more distinctly."

Francis Bacon (1561-1626) developed the scientific method used to authenticate research. He saw religion and science as complementary. "Science, so far from being antagonistic, has enriched religious thought." He admitted, however, that at first science appears to negate religion. "This I dare affirm in knowledge of Nature, that a little natural philosophy and the first entrance into it, doth dispose the opinion to Atheism." "But, on the other side," Bacon continued, "much natural philosophy, and wading deep into it, will bring about men's minds to religion." Bacon thought scientists too often saw themselves, not God in nature: "We clearly impress the stamp of our image on the creatures and works of God, instead of carefully examining and recognizing in them the stamp of the creator himself."

The most famous work of Louis Pasteur (1822-1895), of course, was purifying milk with the process that now bears his name. He often referred to a "cosmic asymmetric force" that created life, and he thought the word *cause* "ought to be reserved to the single divine impulse that has formed this universe."

Albert Einstein (1879-1955), who formulated the theory of relativity, did not believe God was involved in the day to day operation of the universe, but he wasn't hostile to religion either. He recognized that "the main source of the present-day conflicts between the spheres of religion and of science lies in this concept of a personal God," but he also acknowledged the "harmony of natural law, which reveals an intelligence of such superiority that, compared with it, all the systematic thinking and acting of human beings is an utterly insignificant reflection." To Einstein, "the cosmic religious experience is the strongest and noblest driving force behind scientific research." Simply put, "science without religion is lame, and religion without science is blind."

Many leading scientists today see no contradiction between religion and its fabled antithesis. Physicist Charles Townes, 1964 co-winner of the Nobel Prize, sees religion and science as "basically the same thing." Townes, who recently outlined his views in an interview with the *Washington Post*, explains that "both are human creations. In both we use faith, we use assumptions, and we have uncertainties." "I've always based my moral and religious ideas on the idea that there is something out there 'bigger than [man].'" That view, he adds, "is what I base my actions on." Townes believes some scientists take bigger leaps of faith than religious believers: "To get around the anthropic universe without invoking God may force you to extreme speculation about there being billions of universes," which "strikes me as much more freewheeling than any of the church's claims."

Francis Collins sees God in his discoveries: "When something new is revealed about the human genome, I experience a feeling of awe at the realization that humanity now knows something only God knew before. I don't believe God is threatened by scientific investigation. On the contrary, I presume that God is gratified by our curiosity," he told TAE. Joel Primack, professor of physics at the University of California, Santa Cruz, told *Newsweek* the galaxies of the night sky are "the handwriting of God." Evolutionary biologist and 1958 Nobel Prize-winner Joshua Lederberg recently told *Science* magazine, "Nothing so far disproves the divine. What is incontrovertible is that a religious impulse guides our motive in sustaining scientific inquiry."

The scientific community itself seems poised to rethink its position on the religious question. Many universities, think tanks, and professional organizations are conducting research on the relation between religion and science. MIT is now offering a course on "God and Computers." The American Association for the Advancement of Science and the National Academy of Sciences are both launching projects to promote a dialogue between religion and science. The Chicago Center for Religion and Science, the Center for Theology and Natural Sciences in Berkeley, and the Discovery Institute's Center for the Renewal of Science and Culture are all studying the overlap of faith and science.

Robert Jastrow, founder of NASA's Goddard Institute and author of *God and the Astronomers*, thinks the relatively recent discovery of the universe's birth in a Big Bang has played a large part in this rethinking of the cosmos. It means "there are limits to scientific inquiry," because it suggests a beginning and a creator—something science can't explain. The situation, Jastrow says, is as if a group of scientists and astronomers are climbing up a range of mountain peaks, and when they come to the highest peak, they are "greeted by a band of theologians who have been sitting there for centuries."

Brendan Miniter is a writer living in Alexandria, Virginia.

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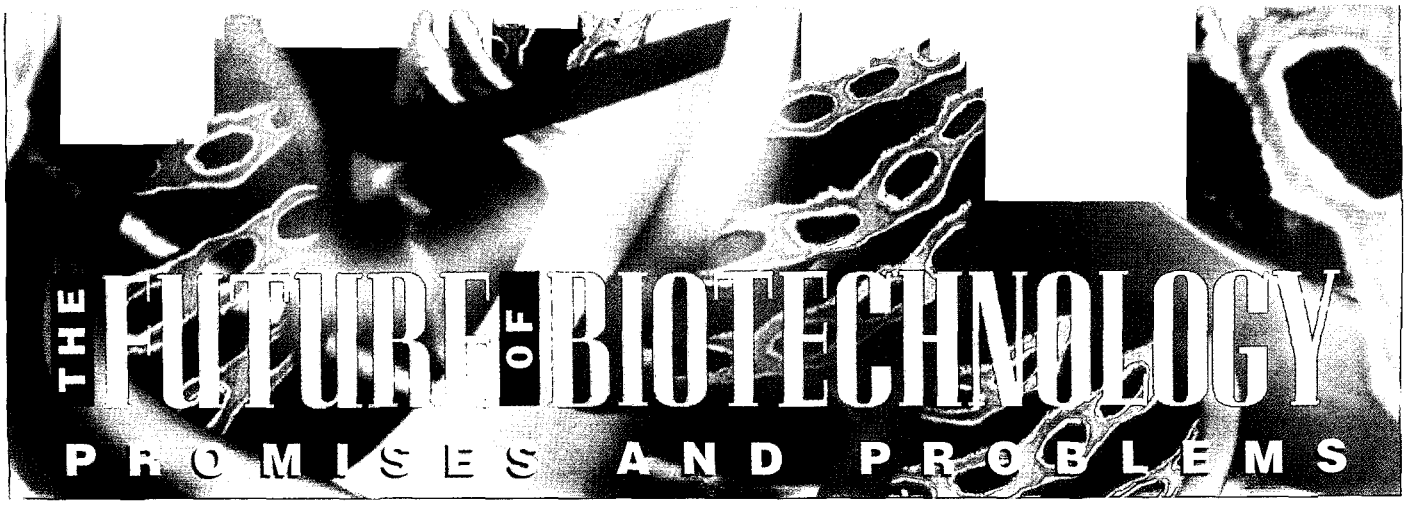

By Clarisa Long

We live in the early years of a technological revolution based on advances in molecular biology and genetic engineering. The biotech industry is one of the country's most innovative sectors. The Human Genome Project, a 15-year multinational effort to unravel all the genetic information contained in our cells, is ahead of schedule and under budget.

Progress in biotechnology and genetic research has created high hopes for some and deep anxieties for others. Biotech is often seen as either Promethean, engaged in saving mankind, or Faustian, dabbling with dark forces beyond our ken. In reality, like any technology, it has elements of both.

Contrary to popular conception, biotechnology is not new. Humans have been genetically manipulating living things to meet their needs since prehistoric times. All over the world for millennia, plants and animals have been selectively bred and microorganisms have been used to make wine, cheese, beer, and bread. Ancient Egyptians applied moldy bread to infected wounds for its healing properties—an early use of penicillin. The beginning of the nineteenth century saw the advent of vaccinations. By the end of the century, microorganisms had been discovered, Mendel's work on genetics had finally achieved recognition, and institutes for exploring biotech processes like fermentation had been established by scientists like Louis Pasteur.

Yet in one poll, roughly 40 percent of those surveyed disapproved of centuries-old techniques of crossbreeding plants when those techniques were described as "biotechnology," and one in five thought such techniques were morally wrong. When the label "biotechnology" was applied to age-old methods of breeding better animals, 62 percent disapproved, and half stated they thought it was immoral. Fully 72 percent of the people surveyed thought they had never eaten a plant produced by crossbreeding—in fact, nearly every fruit and vegetable sold in the grocery store comes from crossbred strains—though nine out of ten of the survey participants said they had a good idea of how food is grown in this country.

From a practical perspective, modern biotechnology differs most from its older forms in the speed with which it can manipulate genetic material. In 1953, James Watson and Francis Crick discovered the double-helical structure of DNA, laying the foundations for modern biotech advances. For the past 25 years, scientists have been able to take individual genes from one organism and insert them into another. They can even take genes from one species and insert them into another.

Such genetic rearrangements are used to improve the nutrition, taste, and appearance of plants, animals, and other food products. Plants engineered with genes for improved pest resistance or fewer nutritional requirements reduce the need for harsh chemicals, fertilizers, and pesticides. For example, Calgene Corp.'s FLAVR SAVR™ tomato is genetically engineered to block an enzyme that would normally cause softening and rotting. As a result, the tomato remains firm in transport to market and can be allowed to ripen on the vine before it is picked. In the environmental arena, organisms can be used to digest pollutants like oil slicks and other hazards. Other genetically engineered microbes are being used in industry to produce new vaccines, solvents, chemical compounds, adhesives, fibers, and lubricants.

Scientists have even been able to create animals that carry pieces of human DNA grafted into their own genetic material. These animals are often breathlessly described as "designer animals." A "designer" cow, for example, can be genetically engineered to secrete into its milk substances normally found only in humans. Such organisms, which run the gamut of species from bacteria to sheep and cows, are used to produce insulin, human growth hormone, and other compounds that previously were prohibitively expensive to synthesize in laboratories. Other genetically engineered animals, such as the OncoMouse,™ a mouse with a genetic sequence predisposing it to develop cancer, are used in scientific research.

"Biotechnology is revolutionary in the field of medicine. It uses natural weapons—infection-fighting proteins found in the body and the process of life itself—to bolster the human immune system to fight disease," explains Carl Feldbaum, president of the Biotechnology Industry Organization. The pharmaceutical industry is developing new generations of drugs and vaccines to prevent and treat diseases such as hepatitis B, influenza, anemia, diabetes, heart attacks, human growth hormone deficiency, AIDS-related Kaposi's sarcoma, hairy cell leukemia, and kidney transplant rejection. Genetic tests are being developed for thousands of mutations that cause disease in humans. Biochemical assays are used to screen the public blood supply for HIV and the hepatitis B and C viruses.

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"Biotechnology provides the key to the mysteries of AIDS, multiple sclerosis, and cystic fibrosis. Using this tool, we will solve the worst diseases we face."

In the realm of Big Science, the Human Genome Project is making a detailed map of human DNA. The hereditary instructions contained in DNA guide the development and repair of the body throughout a person's lifetime. The 23 pairs of human chromosomes are estimated to contain anywhere from 50,000 to 100,000 genes, although it appears that only about 5 percent of these are ever active. This project, guided by the National Institutes of Health, has a $3 billion budget and is estimated to be completed by 2005. The research surrounding the human genome is important, not just for discovering new genes—that's the easy part—but also for identifying the specific functions of each. Thorough knowledge of the genetic basis for disease can help prevent disease, treat genetic conditions, and identify important new drugs.

The power of cooperation between basic research and industry is tremendous. Applied to medicine, such cooperation opens up new approaches to understanding and treating illnesses. Applied to agriculture, it has the potential to extend the so-called "green revolution" through seeds with higher protein content, plants that require less fertilizer, crops that grow in poor or salty soil, and plants that are genetically pest-resistant or even manufacture their own pesticides.

Modern biotechnology promises innovations in the fields of agriculture and food production, energy, the environment, and medicine. Population growth and the desire for cheap food drive the need for an ever-expanding food supply. Understanding the genes of wild animals and plants will help the pharmaceutical industry design new drugs and industrial compounds.

Biotechnology is giving us the potential to treat previously incurable diseases. The appearance of "superbugs," such as antibiotic-resistant tuberculosis bacilli, and deadly diseases like AIDS are forcing scientists to derive new therapies. Researchers are using the tools of biotechnology to develop faster and more efficient diagnoses and treatment for diseases such as cystic fibrosis, sickle cell anemia, and diabetes. Gene therapy, which introduces into the relevant tissue working genes to replace damaged or faulty ones, has already successfully provided two young girls with functional adenosine deaminase genes that "turned on" their malfunctioning immune systems, allowing them to lead relatively normal lives. Scientists want to expand gene therapy to treat a host of other life-threatening diseases such as cancer.

Cross-species organ transplantation has the potential to save thousands of lives. Each year, approximately 3,000 Americans die waiting for organ transplants, while another 40,000 are on a waiting list for donors, according to the United Network for Organ Sharing. Scientists are working to alleviate the perpetual shortage of human organs available for transplantation by developing genetically engineered pigs whose organs—heart, liver, lung, or kidneys—can be transplanted into humans. But there are some troubling medical problems to be overcome first, such as the possibility of infecting patients with viruses native only to pigs. Concerns over such species-jumping viruses—in this case from birds to humans—precipitated the mass slaughter of chickens in Hong Kong in the winter of 1997-98 to prevent spread of the so-called "avian flu." The vaccine designed to combat avian flu was itself a biotech product. It contained a purified, genetically engineered version of a protein called hemagglutinin, a component of the virus. Biotechnology also greatly assists efforts by the Centers for Disease Control to monitor the spread of diseases like influenza and to develop vaccines against them.

One of the most exciting frontiers of biotechnology occurs at the junction of the Human Genome Project and information technology. Affymetrix, a firm in Santa Clara, California, has produced a "biochip," or DNA array, called the GeneChip.™ It resembles a silicon chip and has the capacity to analyze thousands of genes at once. Ironically, the technology is ahead of the basic science: Molecular biologists are still working on identifying and providing genes for DNA arrays to analyze. Affymetrix hopes that within the next decade it can use this technology to analyze a patient's genetic risks for dozens of diseases, based on a cell sample. A little further down the road may lie tiny chips implanted in the body to deliver precise amounts of drugs to regulate heart rate and hormone secretion or to control artificial limbs.

Whatever the future of these particular avenues of scientific exploration and discovery, biotechnology will loom large in the coming century. According to Dr. Anthony S. Fauci, director of the National Institute of Allergy and Infectious Diseases, "Biotechnology provides the key to unlocking the mysteries of AIDS, multiple sclerosis, and cystic fibrosis. Using this tool, we will solve the worst diseases we face."

Critics of biotechnology paint a darker picture. Some are concerned that genetically engineered herbicide-resistant crops will cross with non-agricultural weed relatives and spread herbicide-resistance into weed species. Others argue that we should devote more time to testing the safety of genetically engineered foods. For example, last May a coalition of scientists, public-interest organizations, and religious groups filed a lawsuit against the Food and Drug Administration (FDA) attempting to have 36 genetically engineered foods taken off the market. The plaintiffs claim that by not requiring testing and labeling of genetically engineered foods, "the FDA has made millions of American consumers the guinea pigs to test the safety of these foods."

Still other critics voice concerns about the ethical treatment of humans and animals, the risks of environmental or biological contamination arising from the use of biotechnology, and the alteration of genetic material. Ethicists ask whether, having tampered with the genetic inheritance of plants and animals, we are sliding down a slippery slope to genetic manipulation of humans. The cloning of Dolly the sheep led some to fear that our species would be next.

Because we all carry genetic predispositions to various illnesses, the hope of a healthier future through genetic research applies to all of us. But we must address the Faustian aspects of

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biotech as well as the Promethean. Heroic as science and technology can be, the twentieth century bears witness to the moral evils that flourish when science is divorced from ethical standards. Biotechnology has evolved so quickly in the past 20 years that we are racing to catch up with its moral implications. Particularly when it affects human DNA, it raises social and moral issues that are among the most daunting, fascinating, and troublesome of all those created by modern technology.

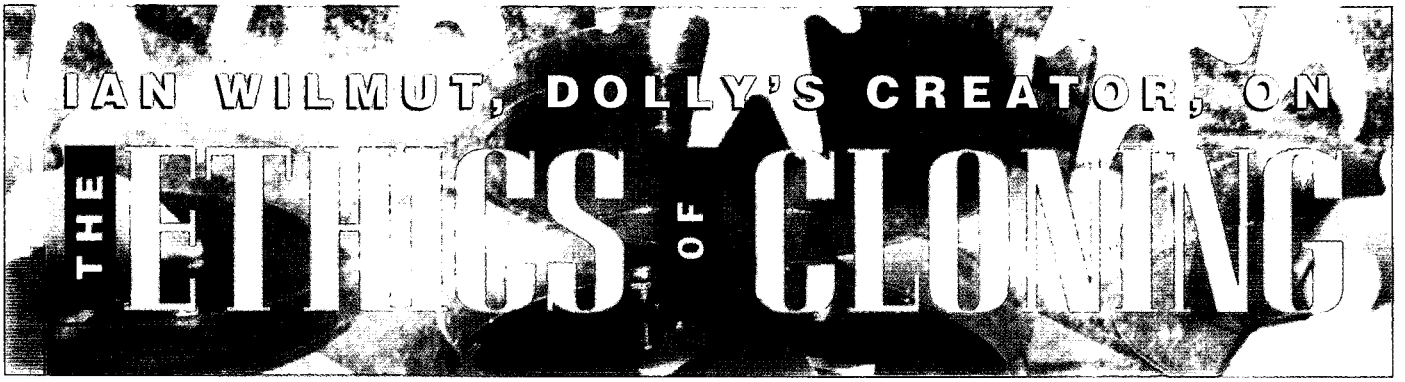
More than 4,000 single-gene diseases (diseases attributable to a single mutant gene, as opposed to multiple genes or environmental factors) are now known. Yet despite the astonishing progress wrought by the genetic revolution, we are able to diagnose far more conditions than we can treat. This raises troubling questions about when genetic testing is appropriate, who should have access to the results, and how to distinguish between a genetic condition and a disability. How far should our society encourage or discourage research and development in biotechnology? Are there limits to the kind of research we should conduct? If so, how do we determine and enforce these limits? Which decisions should be left to individuals? Which should be decided by legislation?

Biotechnology research, particularly the Human Genome Project, offers precious insights into the genetic basis of disease. But this scientifically invaluable information has encouraged a purely mechanistic conception of humanity. Genetic knowledge often gives its holders an over-developed sense of fate, as illustrated by Nobel Laureate James Watson, former head of the Center for Human Genome Research at the National Institute of Health, when he said, "We used to think our fate was in the stars. Now we know, in large measure, our fate is in our genes." Reducing the essence of humanity to the workings of our genetic material is a mental shortcut fraught with subtle dangers. Although it is comforting to shift responsibility for our diseases or our behavior onto our genes, such a mechanistic approach is dehumanizing and ultimately false.

On a day-to-day policy level, perhaps the most worrisome developments created by genetic research involve questions of privacy and genetic discrimination: Will employers be able to make employment offers contingent upon the release of medical (and presumably genetic) records? Are there times when genetic testing may be appropriately mandated? Should there be an obligation to tell a spouse or a child? Will insurance companies be allowed to use genetic information to determine risk, and thus to limit the pool of insured persons to a certain level of general health in order to contain costs for the group?

"In the end," concludes Daniel Callahan, a bioethicist at the Hastings Center, "I see biotechnology as a great experiment. We really don't know yet where it is going. We don't know what it will do for us or to us." No doubt significant challenges lie ahead in the proper application of the powerful revelations of biotechnology, particularly human genetics. But its positive potential is at least as great as the challenges it presents. "The future for medicine has never been brighter," says Dr. William Haseltine, CEO of Human Genome Sciences. "We are now beginning to understand how to apply this technology to a broad range of problems."

Clarisa Long is the Abramson Fellow at the American Enterprise Institute and a research fellow at Harvard University.



This January the Scottish scientist Ian Wilmut, who led the team that cloned Dolly the sheep, gave a talk on the moral issues raised by the technology at Calvin College. Demonstrating the mutual dependence of science and ethics, he carefully explained what scientists in the field were doing, then discussed the morality of genetic research and the limitations that might be put on it. Excerpts from the speech follow.

Many of you may remember that Dolly was produced from 277 embryos, about 30 of them developed for a week and transferred into recipients, but from those, we only obtained one live lamb. These losses are quite disturbing if they happen with an animal, but I think to contemplate doing anything which might produce a person using this technology is really quite appallingly irresponsible: of the women that became pregnant, far more than half of them would lose their children, their babies, and of children that might be born many of them would die within a few days of birth.... There is a major safety issue which should justify the banning of this technology to produce people for the foreseeable future.

...An additional limitation to the current technology: Some of the lambs are born unusually large, so that they threaten the well-being of both mother and lamb....

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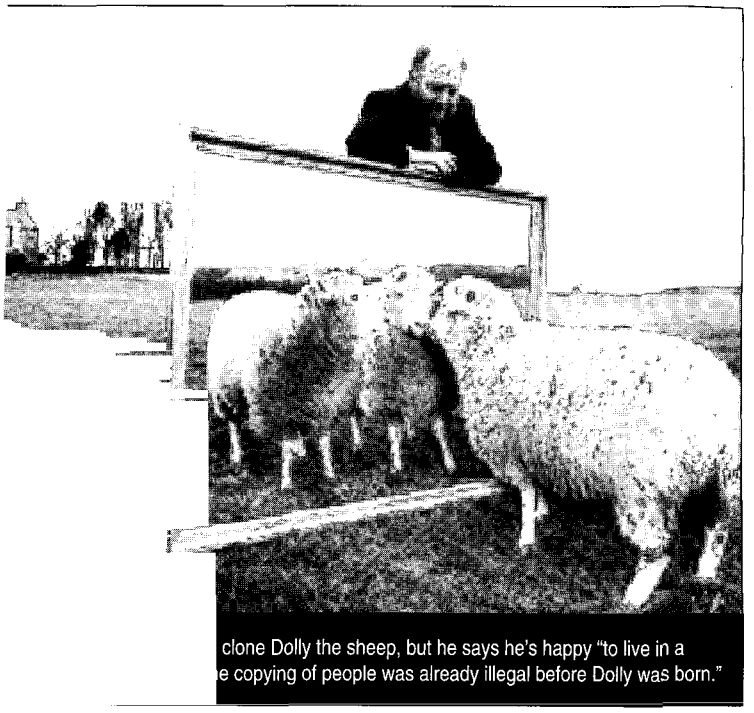

clone Dolly the sheep, but he says he's happy "to live in a
e copying of people was already illegal before Dolly was born."

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Should we copy people? ...Let's say my wife and I are unable to have children, and so you would make a copy of me, so that my wife would have to live with me and a little copy of me. [Laughter]

Why is it that people are so slow on the uptake in understanding the consequences of this? I can't for the life of me see how you could have a normal relationship between any of those three people.

• • •

I also understand the objective behind the second suggested application, which is to bring back a lost relative, usually a child....

But if you took cells from the child and made a copy you would produce a new baby.... That child is going to grow into a different person. So to my mind, it is not acceptable to think of making a copy of a child, because you are putting unacceptable pressures on that child to become like the one who has been lost....

I don't understand the suggestion that you might choose to have children who are copies of an individual you admire, whether it's an athlete or a film star, scientist or politician.... To my mind it is not an acceptable thing to say to somebody, "I've had you because you are going to grow into a football player."...

On the other hand, there are uses for this technology with human embryos which I do find acceptable, in fact, desirable, but they don't involve copying people.

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Another group of applications concerns making genetic change.... For example, cystic fibrosis is a genetic disease reflecting an error in one gene. There isn't an effective treatment for it.... So it is suggested that we should give sheep cystic fibrosis, so that you would then have an animal which is more similar to the human in its physiology and its size, to study the disease, to assess new drugs, and most importantly of all, perhaps, to assess strategies for putting genes into the respiratory tract as a way of giving longer-term treatment....

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Let's imagine that you have a couple who may produce a child with cystic fibrosis. There is a possibility that when they have an embryo which has the defect, you could grow out cells from that embryo...correct the genetic error, and use nuclear transfer to make a new embryo exactly the same as this one, except that the error has been corrected. So you cure that disease not only in that child but in all of that child's offspring. I have to say that's attractive, isn't it?... But again, to some people that would be completely unacceptable.

This is the easy case, though. I could equally well have said that when the genomapping projects identify genes associated with I.Q., athleticism—any of the things which we all wish to have in our children—that you could use the same biology to make those changes.

Why is that different? There's a biological reason. Cystic fibrosis reflects one gene. The other things almost certainly would not. So it's technically much more difficult. There would be a much greater risk that in doing something with an apparently desirable effect you would somewhere else have an undesirable side effect.

So there's a technical difference, but also an ethical issue. I would be much happier to accept us all, warts and all as we are, than do this....

• • •

Let's stick to the patient with Parkinson's disease. Can we find a way of taking cells from that patient and getting undifferentiated cells to develop into the kind of nervous cell which is needed to repair that person's nervous system, or at least support it?

The catch is that the only way we can produce these at present is by doing nuclear transfer and making a new embryo.... I think I would be happy, would be willing, to think of using an embryo like this as a source of cells for treatment. But again, I fully understand that there are people to whom that would be an appalling idea.

...There's a lot of research going on to find ways of taking perhaps blood cells and causing them to de-differentiate directly without making an embryo. That would have the practical advantage that you wouldn't need the unfertilized egg, and the ethical difference that you wouldn't be creating a potential person.

I'm quite sure that for some cell types this will become possible. So again, major potential medical benefits in the future but very important ethical choices which have to be made.

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Because there is still a lot to learn, I think we have time for important discussions as to which of these potential applications, if any, are acceptable in your society. Personally, I am very comfortable to live in a society in which the copying of people was already illegal before Dolly was born....

The place where a person will most likely be copied is here in the United States.... You give great emphasis on the rights of people to reproduce in the way they want, and you have the money. And, if I may, I would suggest you have been irresponsible in that you do not have legislation to regulate the use of this technology. Fortunately, I think there is time to put that in place.

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Arguing

Fleeing Science and Reason

By Christina Hoff Sommers

American pre-eminence in science and high technology is a major reason the twentieth century will go down in history as the American Century. So it is astonishing, as well as dismaying, that some of our cultural custodians feel morally impelled to impugn American science in the public's eye and to minimize what American science and technology has done to improve our lives.

Indeed, the government has been significantly active in promoting what scientists are now beginning to call "the anti-science movement." This movement is, first, an attack on what scientists do and how they affect our society. Second, it is an intellectual attack on science as a method of reaching objective truth. Both aspects of the anti-science movement were the topics under discussion at an extraordinary meeting convened by the New York Academy of Sciences and entitled, "The Flight from Science and Reason."

Professor Gerald Holton, physicist and historian of science at Harvard University, described how the Smithsonian Institution blindsided the American Chemical Society (ACS). This affair had received far less publicity than the notorious *Enola Gay* exhibit at the National Air and Space Museum (which condemned America for ending World World II with the atomic bomb), but in many ways it is a more telling example of the kind of politics that seems to predominate at the Smithsonian.

In 1989, Holton's story began when the ACS commissioned the Smithsonian's National Museum of American History to design a permanent exhibit on "Science in American Life." The ACS scientists naturally expected an exhibit celebrating the triumphs of American science and did not imagine that this needed to be spelled out in the contract. But five years and $5 million later, what the scientists got was an exhibition that presented American science as a series of moral debacles and environmental catastrophes: Hiroshima and Nagasaki, *Silent Spring*, Love Canal, Three Mile Island, and the explosion of the space shuttle. The ACS was not opposed to showing undesirable effects of science and technology, but they were disturbed that by highlighting failures and horrors the Smithsonian exhibit took an overwhelmingly negative view of American scientific achievement. Head curator Arthur Molella was unmoved by the ACS's complaint that the exhibit lacked balance. As he told *Science* magazine, "The purpose wasn't to do something about the triumphs of science." The curators defended their one-sided presentation as if theirs were the only honest and principled stand: "We know it is important to preserve the integrity of the Smithsonian," one sniffed. (It would take us too far afield to trace to its source in "postmodern" thinking the self-righteous pretentious mindset of this official. But for a profound analysis, read Robert Bork's *Slouching Towards Gomorrah.*)

Government officials are usually more careful about hiding an animus to science. Sometimes, however, the hostility seeps through. When a recent survey announced the sensational (but grossly inaccurate) finding that four out of 10 American women suffered "severe depression" each week, Donna Shalala, Secretary of the Department of Health and Human Services, hailed the research: "For too long health care [and] health care research has been addressed from one point of view, the white male point of view." Here again one sees how the hostility to science is tied to another, doctrinal hostility, in this case the hostility to those (cognitive but unfeeling) great white males who are the obsession of academic feminists.

Anti-science and anti-Western civilization attitudes show up everywhere in the government. For example, Robert Park, a University of Maryland physicist, informed the New York Academy of Sciences meeting that the National Institutes of Health (NIH) now have an Office of Alternative Medicine. He discussed one of the Office's reports which takes seriously the curative powers of the "Lakota medicine wheel." Another discusses "mental healing at a distance." Park warned of "a resurgence of belief in magic and psychic phenomena, which has spread to all levels of society, including the NIH."

And of course, we expect anti-science to show up in government education programs. The U.S. Department of Education, particularly its Fund for the Improvement of Post Secondary Education, actively supports anti-scientific education projects. It backed, for instance, *Women's Ways of Knowing*, an influential book that impugns "male ways of knowing" as excessively concerned with logic and hard data. The book instead "valorizes" something called "connected knowing," a compassionate style of cognition at which women are supposed to excel—provided of course that they are not politically conservative.

The National Science Foundation (NSF) sins mainly by omission: It has done almost nothing to counter the growing anti-science movement, nor has the American Association for

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the Advancement of Science. On the other hand, the NSF recently sponsored a Faculty Development Project that ran seminars and workshops on the doctrines of prominent anti-science feminist thinkers who are given to attacking the "masculinist approaches to science." Professor Sandra Harding of the University of Maryland, for example, compares traditional scientific methods to "marital rape"—"the husband as scientist forcing nature to its knees."

THE ANTI-SCIENCE MOVEMENT IS AN ATTACK ON WHAT SCIENTISTS DO AND AN INTELLECTUAL ATTACK ON SCIENCE AS A METHOD OF REACHING OBJECTIVE TRUTH.

Speakers at the "Flight from Reason" conference warned that para-science and pseudo-science become especially dangerous when incorporated into political movements. One physicist referred to this combination of pseudo-science and politics as "a time bomb waiting to explode." According to some alarmed scientists, the anti-science bombs have already done extensive damage, with enormous potential for further harm. A scandalously inadequate system of science education and a diminished public regard for clear thinking and objective truth are just the early casualties.

Every few years the NSF conducts a survey to test public knowledge of elementary science. One recent question was: How long does it take for the Earth to go around the Sun: one day, one month, or one year? Only 47 percent knew. The rest either didn't know or got it wrong. Meanwhile, according to a *George* magazine poll, fully one-third of Americans seem to take witchcraft very seriously, and more than half believe in some conspiracy theory complete with plots and cover-ups.

Gullible, badly informed people whose trust in science and objective truth has been undermined are ripe for exploitation. Of course, a credulous, intimidated, and insecure population is a boon to big-government liberalism, because scared people are vulnerable to the idea the government must and can help them.

Conservative opponents of big government have also been known to lie, especially when they are not in power and want to get power. Still, most conservative policies don't depend on untruths. By contrast, modern liberals cannot survive without deceiving the public. They may do it unintentionally but do it they must. For it is a fact that most of the programs liberals favor just don't work. This explains their eager embrace of doctrines that impugn the very idea of objective facts. A scandalously inadequate system of science education and a diminished public regard for clear thinking and objective truth are just the early casualties.

Christina Hoff Sommers is W. F. Brady Fellow at the American Enterprise Institute and author of *Who Stole Feminism?*

THE TRAP OF SCIENTISM

By Stephen L. Carter

Our faith in science, although dying for two decades, remains strong enough that we often succumb to the lure of *scientism*. Scientism is the effort to disguise as science things that have little to do with science, in the hope of making them look more attractive—in much the same way that a fisherman baits a hook hoping the fish will think it is food, or that a politician quotes Scripture hoping the audience will think the politician's preferences are the will of God.

This tendency helps explain why scientists often fare so badly in the courtroom. Forensic science, used to assist in deciding a legal question, should be an important part of our judicial practice. Unfortunately, instead of science in the courts, we see scientism: the manipulation of scientific evidence and the scientific method to reach the desired result. As one commentator has pointed out, "Despite lip service to the contrary, lawyers frequently perceive forensic scientists as strictly utilitarian tools of the lawyer's trade."

A well-known example occurred in the Supreme Court's 1954 decision in *Brown* v. *Board of Education*, when the justices rested on the tentative conclusions of social science their decision that school segregation harmed black children. Probably the Court read the studies correctly, but using them illustrated the trap of scientism: When data are presented in support of a moral proposition, the implicit message is that the moral claim is only as strong as the data. If racial segregation is wrong because social scientists believe it is harmful, the message is, If you think the social scientists are wrong—or if later research proves them wrong—then racial segregation is just fine.

What makes scientism attractive is the hope that one can win a moral argument without discussing morality. The irony of scientism is that it simultaneously acknowledges and denies the traditional vision of singular truths. On the one hand, scientism treats scientific knowledge as infinitely malleable, able to reach any result, support any argument. But that is only in the construction of scientistic argument. In its public presentation, scientism treats science as settled and clear, a collection of irrefutable if unexplainable facts; not the asker of difficult questions but the provider of easy answers. The debater who goes to scientism wants the audience to understand that only a flat-earther would disagree.

Scientism's exaltation of scientific results (but not scientific method) is a transparent device for avoiding debate. If I make a scientistic claim, my message is that I have not mere opinion but actual science—*truth*—on my side. This attitude treats those on the other side of the moral issue as though they cannot possibly have anything important to say. Scientism thus denies my opponents the fundamental respect derived from the requirement that we love our neighbors. There is no trust, no generosity, no hope of civil listening, because there is no listening at all.

Despite its tendency to deaden dialogue—or perhaps because of it—the lure of scientism is tremendous. For example, we see the gay rights movement enthralled by the idea that scientific evidence shows a genetic tendency toward homosexuality. Never mind that nobody has been able to replicate the one study of DNA on which the claims are based, or that (according

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to news reports) the researcher himself has been investigated for possible fraud. Or that the pressing moral question on all matters of sexuality, for heterosexuals and homosexuals alike, is not what set of biochemical reactions causes people to feel particular urges, but which of our many urges we should allow to influence our lives. One can make a perfectly sensible gay rights argument on the right to privacy—it is neither the state's business nor the boss's what consenting adults do behind closed doors—and the Supreme Court looked very bad in holding otherwise. As in *Brown*, to rest one's case on a controversial scientific claim may weaken the more important moral claim.

WHAT MAKES SCIENTISM ATTRACTIVE IS THE HOPE THAT ONE CAN WIN A MORAL ARGUMENT WITHOUT DISCUSSING MORALITY.

In each case, questionable science is being used to buttress a claim that proponents have actually reached on some other ground. The proponents, however, are uneasy stating the chain of reasoning that has led them to their moral conclusions. So they try science instead, which perhaps seems more "objective." But that is the other side of scientism's trap: It persuades us that our strongest moral convictions are useless in public debate unless we can repackage them as the conclusions of natural science.

Scientism thus betrays a lack of faith in our ability to conduct dialogues on moral questions and demonstrates a disbelief that our opponents might have anything useful to say.

Stephen L. Carter is the William Nelson Cromwell Professor of Law at Yale. This article is adapted from his book *Civility: Manners, Morals, and the Etiquette of Democracy.*

I.Q. AND THE LEFT

By Ronald Bailey

It is a curious fact that leftists believe I.Q. exists in the presence of environmental toxins and somehow disappears in the presence of educators. That is to say, the Left's use of I.Q. depends entirely on which agenda is being promoted at the time. If the leftists in question are operating in their guise as environmentalists, I.Q. exists because it measures the harm done by corporations that pollute. But if activists are in egalitarian mode, then evil and bogus I.Q. tests stand in the way of preserving affirmative action in college admissions, eliminating ability tracking in public schools, and so forth.

First, listen to what the Left has to say about the non-existence of I.Q. in the field of education. Recall the apoplectic scorn heaped upon Richard Herrnstein and Charles Murray's study of I.Q., *The Bell Curve.* "Most important among *The Bell Curve*'s misleading claims is the contention that intelligence is a measurable substance and the I.Q. test is a reliable measuring device," wrote psychologists Reuven Feuerstein and Alex Kozulin. "This claim sets us back 50 years, ignoring all the achievements of cognitive and developmental psychology in the last half of the twentieth century."

The redoubtable professors Lani Guinier and Susan Sturm asserted in the *California Law Review* that "We are mired in a testocracy that, in the name of merit, abstracts data from individuals, quantifies those individuals based on numerical rankings, exaggerates its ability to predict those individuals' future performance, and then disguises under the rubric of 'qualifications' the selection of those who are more socioeconomically privileged."

Case Western Reserve University physicist Singham Mano wrote in the *Phi Delta Kappan,* "Neither biology nor psychology nor sociology has provided any convincing evidence that human beings possess a single trait called intelligence." *New York Times* editorialist Brent Staples, writing in *Essence,* witheringly dismissed I.Q. testing: "Intelligence scores by themselves mean almost nothing. They don't predict who will end up in boardroom *versus* who will end up in the mail room."

On the other, "green" hand, left-wing environmentalists confidently assert that man-made toxins like lead paint and polychlorinated biphenyls (PCBs) are responsible for reducing that supposedly non-existent and immeasurable thing, I.Q. For example, in their much-ballyhooed book, *Our Stolen Future: Are We Threatening Our Fertility, Intelligence, and Survival?* environmentalists Theo Colborn, Diane Dumanoski, and John Peterson Myers demand, "Why did the Scholastic Aptitude Test scores of high school seniors seeking college admission begin to fall sharply from their high point in 1963 and continue downward for two decades?" They review the usual explanations for the falling scores of American kids, but in the end they darkly ask if it was "because they were exposed to PCBs or other thyroid-disrupting chemicals before birth?"

It must be dismaying to committed egalitarians like Guinier and Feuerstein that their environmentalist brethren clearly believe in the reality of I.Q. "Some human studies have suggested that contaminants at levels currently found in the human population could impair mental development enough to cause a five-point loss in measurable I.Q.," write Colborn, Dumanoski, and Myers. Vice-President Al Gore even endorses the notion that man-made chemicals could be reducing kids' intelligence in his introduction to the book.

On June 2, "Frontline" warned PBS viewers that researchers at Wayne State University, Sandy and Joe Jacobson, "have been studying I.Q. levels in children whose mothers had high levels of PCBs in their blood, mostly from eating Great Lakes fish. The Jacobsons have found a six-point I.Q. loss in those children who were heavily exposed to these chemicals in the womb."

Similarly, *Science News* takes seriously the claim that PCBs lower children's I.Q. Its reporting flies directly in the face of the egalitarian Left by quoting University of Rochester behavioral toxicologist Bernard Weiss as he argues that the financial consequences of these declines in intelligence allegedly caused by man-made chemicals "could be stupendous." Weiss observes that economists have correlated I.Q. and earning power and have con-

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SPACE

WHAT EVER HAPPENED TO THE FINAL FRONTIER?

WHY NASA MUST GO

By Richard Miniter

This is the way the future was supposed to be: Nuclear-fueled rocket ships would take off like airplanes and fly into orbit, docking with silver donut-shaped space stations. From there, well-groomed astronauts would embark on robot-piloted spaceships and plant the stars and stripes throughout the solar system. Meanwhile, on the cloud-shrouded planet they left behind, white lab-coated scientists working with supercomputers, atom-smashers, and other wondrous devices would slowly but inevitably unravel the mysteries of the universe.

This may sound like a Technicolor science fiction movie directed by George Pal, but to many government officials, public intellectuals, and even scientists, these silvery dreams sounded quite possible in the 1950s. Indeed, Willy Ley, a best-selling author who was an early champion of space travel, and Wernher von Braun, the German-born rocket scientist who became the godfather of the American space program, predicted many of these things would happen by 1980.

Their confidence in limitless progress may seem misplaced and outsized today—an intellectual version of tail fins—but extreme optimism was reasonable in the halcyon days after World War II. The Manhattan Project had proved that American know-how and federal funds were an unstoppable duo. Atomic-powered submarines navigated the polar ice packs and polio was beaten with a simple vaccine. In the following decades, the federal government would spend tens of billions on science projects ranging from the historic (the moon landing) to the absurd (ESP research). Domed moon bases were next. Nothing was impossible.

For the next two decades, the space program seemed to embody all that was right with America. While hippie anti-draft protesters burned the American flag and riotous mobs looted America's cities, clean-shaven astronauts daringly piloted ever larger spacecraft ever farther into the heavens. Network cameras rolled as astronauts made the first space walk, the first trip around the dark side of the moon, and finally the first landing on the moon. It was triumphant, exhilarating, historic. The space program had become a beacon of hope in a decade of defeat and despair.

Gradually, the beacon faded. Confidence in government's ability to push science forward stumbled in the 1970s. Though the bulk of federal research funds goes to roughly 200 politically wired universities located in influential congressional districts, funding has declined from a peak of 1.6 percent of total federal outlays in 1965 to about 1 percent in 1995. In other words, research funds fell while nearly every other category of government spending climbed to its highest peak in U.S. history. Meanwhile, private sector basic research spending, at more than $130 billion in 1997, has consistently outpaced federal and state spending, which total less than $60 billion. In many labs, federal grants (which are relatively small and require large amounts of paperwork) are considered more trouble than they're worth. The Era of Big Science was over.

Big Science has produced a string of big failures. From the Synthetic Fuels Corporation, which gobbled more than $100 million in taxes and never produced a practical alternative to gasoline, to the Superconducting Super Collider, a potentially multi-billion effort to test the theories of high-energy subatomic physics at a lab in the Texas desert. Comparable facilities already existed in Switzerland, a fact which spurred the Democrat-led 103rd Congress to kill the project. In the same Congress, the House came within one vote of killing the space station.

The federal government was gradually getting out of the science business—until House Speaker Newt Gingrich came to power. Gingrich plans to double science funding over the next eight years to more than $32 billion. "I'm for cutting Washington bureaucracy and I'm also in favor of shrinking social programs," Gingrich said, but "investing in the future" via science programs

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Pocket calculators, pacemakers, and microwave ovens can all be traced to the space program. "It's more than just Tang," says one Hill staffer defensively.

"should be second only to fighting illegal drug use" on the GOP's agenda. This is a time-warp agenda. Gingrich's science initiative is straight out of the 1950s. In fact, Gingrich may be uniquely susceptible to the "silver donuts in space and domed moon bases" vision. Nearly 20 years ago, Gingrich and then-Representative Robert Walker (R-Penn.) met with a group of young NASA engineers and scientists at the Congressional Hotel. "The meeting was supposed to last a couple of hours. We ended up staying up most of the night with those guys," Walker told the *Washington Post* recently. Gingrich makes no bones about being a space enthusiast and simply doesn't look at NASA with the same strict scrutiny that he applies to welfare or public housing.

Gingrich's science spending spree has already begun. The National Institutes of Health, a major source of research grants for universities, has almost doubled its budget since 1994, when GOP "budget-cutters" won control of Congress. Gingrich is twisting the arms of key lawmakers on the House Appropriations Committee to approve President Clinton's proposed $1.15 billion boost in NIH funding for next year. With science funding expanding for the first time in decades, NASA is hoping to increase its slice of the pie.

Why expend political capital to boost the budgets of science programs that even Democrats have voted to cut? "These programs reward the taxpayers with a major return on their investment," says Representative John Boehner, the chairman of the House Republican Conference.

Return on investment sounds like a hard-headed principle. Millions of tax dollars for the space program produce billions of dollars of scientific advances and new inventions. Pocket calculators, pacemakers, and microwave ovens can all be traced to the space program. "It's more than just Tang," says one Hill staffer defensively.

Despite congressional claims, the return on investment for the space program and other government science programs is notoriously hard to calculate. Not that Republicans bother to calculate it. Gingrich doesn't seem to have an exact figure in mind when he mentions return on investment. Apparently this is just a phrase that he learned from some of his Wall Street backers; his staff seems to believe that a return on investment occurs if the taxpayers receive anything in return for the vast sums of money they have "invested."

This is the way the future turned out to be: America's first space station, *Skylab,* fell from orbit and trailed burning debris into the Pacific Ocean. Its replacement, a $24 billion behemoth called the International Space Station is more than a decade late and the source of endless squabbles. America's sole orbital base is rented space aboard *Mir*, a leaky, risky Soviet-designed space station. Americans aboard *Mir* faced more near-death experiences over the last year than an action movie hero: flash fires, oxygen shortages, computer failures, and even a puncture in the station's outer hull which depressurized a part of the tiny station. NASA's bureaucrats claimed that such near-catastrophes are actually benefits in disguise because they taught them how to work well with their Russian partners.

The space program now strikes many Americans as a national tragedy. Since 1973, it has largely been a string of politically motivated failures: the *Apollo-Soyuz* mission, a mid-1970s presidential effort to make peace with the Soviets by linking their spacecraft with ours and shaking hands in orbit failed to keep the Soviets from invading Afghanistan. *Skylab*, the nation's first space station, was hastily assembled and launched from discarded Saturn rocket fuselages. It was a quick political triumph for Presidents Nixon and Ford, though it soon fell to Earth. The National Aerospace Plane, a pet project of Reagan administration cronies and their aerospace industry allies, never took off. The Hubble telescope had a defective lens that was manufactured in a key congressional district. The *Mars Observer* was launched into space and never responded to Mission Control's command. It now wanders space as a man-made asteroid. Then there's the so-called "Mission to Planet Earth," which began as a Bush administration sop to the environmentalists. It was supposed to be a small program: a few satellites scrutinizing the planet. Vice-President Al Gore has enlarged the project dramatically. Now perhaps a dozen satellites will take the Earth's temperature to prove the existence of global warming—something that NASA's satellite data has consistently shown doesn't exist. Price tag: $33 billion over the next 25 years. "This is perhaps the biggest of the boondoggles," says a staffer on the House Science Committee.

These are not isolated examples. NASA has become a "$14 billion, 22,000-person agency [that] has become almost grotesquely inefficient, wasteful, and fundamentally incapable of nurturing the seeds of human space flight exploration planted by Apollo," concludes Courtney Stadd, a former NASA employee who now works as an aerospace consultant. A close look at NASA's highest priority project, the International Space Station, reveals that Stadd's analysis of NASA isn't far wrong. The space station, like NASA itself, has become mired in such problems as:

Cost overruns. At NASA costs go up over time, not down as in the profit sector. Still the magnitude of the cost overruns is startling. In 1984, NASA estimated the total cost of completing the orbital station would be $8 billion. By 1994, more than $10 billion had been spent, but only a handful of the parts were near completion, let alone put into orbit. The total cost is now projected to be $24 billion, and the station will cost almost $100 billion over its lifetime.

Space station defenders say that the technological improvements that result from the microgravity experiments the station will conduct will more than cover the additional costs. This can't possibly be true. Even if the station's microgravity could turn lead into gold, it would still be a money loser: It costs $13,000 per pound to put something into space, but gold is only worth about $6,000 per pound on Earth.

The space shuttle is also no bargain. The re-usable shuttle was supposed to make it even cheaper to put men and satellites in space. In the last days of the Apollo program it cost $710, in today's currency, to put a pound in orbit. Today the cost is more than $13,000. (That's why Representative Dana Rohrabacher,

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chairman of the House Subcommittee on Space and Aeronautics, calls the shuttle "the most effective device known to man for destroying dollar bills.") Meanwhile the French can put a satellite in orbit for $6,200 per pound and the Chinese can do it even more cheaply. "Isn't there an alternative to going to Communist governments and saying 'launch our satellites'?" asks the Heritage Foundation's Ron Utt.

Delays. Announced by President Reagan in 1984, the Space Station was supposed to be built and operating by 1997. Now the best estimates indicate that the station won't be ready until February 2007. Of course, the space shuttle itself was delivered almost a decade late.

There is a human dimension to NASA's endless delays that is often overlooked. "A scientist working on the CRAF-Cassini mission to Saturn began working on the program when it was approved and funded by Congress in 1990. He was about nine years into his career, with one project behind him, married with no children," write Joan Johnson-Fresse and Roger Handberg in their new book *Space: The Dormant Frontier*. Then the launch date is moved back from 1994 to 1995 and finally to 1997. "Meanwhile, life on Earth goes on and our scientist becomes a father. If launch now goes according to plan, the spacecraft will reach Saturn in June of 2004 and the mission will be completed when the scientist's child is 16 years old." The scientist will be more than 25 years into his career and have time left for perhaps one more project. These sort of bureaucratic delays and project cancellations have ruined careers and sent many scientists into the private sector, where things usually happen on time. Still, NASA has yet to learn that delays cost more than time and money.

Politics. "The [space station] is now just a jobs program," Albert Wheelon, a former executive at Hughes Aircraft and member of the 1993 presidential space station commission, told *Reader's Digest*. The same is true of the space shuttle. Launching the shuttle requires enormous manpower: nearly 6,500 contractors and 640 NASA employees at Kennedy Space Center; some 5,700 contractors and 1,000 NASA employees at Johnson Space Center; and more than 11,000 contractors at the Marshall Space Flight Center, according to a 1988 government report. (Small wonder that shuttle launches cost upwards of $500 million each.) Those jobs are key to NASA's political support.

If domestic politics is a sideline for NASA, foreign policy seems to be its specialty. "I spent most of my adult life designing weapons to kill Russians. They were designing weapons to kill me. Now we're working together on a peaceful civilian space station," says NASA Administrator Daniel Goldin, who formerly worked for the CIA. Goldin was instrumental in making the Russians full partners in the International Space Station. It wasn't easy. The Russians insisted that they be put in command of the station at least half of the time and that they have the right to put as many as three cosmonauts onto the seven-man crew. (Our European and Japanese partners will never command the station and can put only one man in each crew—though they have paid far more than the Russians.) This is part of the price of turning the space station into a launching pad for diplomacy instead of science.

Petty corruption. Working with the Russians on the space station has forced a normally scrupulous agency to turn a blind eye to an amazing amount of petty corruption. According to NASA consultant James Oberg, NASA officials noticed that Russian space workers in Houston were forced "to save their dollar-denominated per diem payments [paid by NASA]—because their bosses back home demanded half the money as a kickback. And while space officials got rich, ordinary workers on the program are paid less than taxi drivers, and receive their checks months late."

Outside of the United States, the corruption is much worse. Top cosmonaut officials at the Star City training base outside Moscow have allegedly built three-story brick mansions—with funds paid by NASA to build key parts of the space

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IT'S NOT TOO LATE TO BECOME A SPACEFARING NATION

By Jerry Pournelle

Napoleon's power ended at the water's edge, and throughout history control of the sea has been decisive. Space is likely to be as critical in the next millennium as seapower was in the last two. Recognizing the need for spacepower capabilities, the United States established NASA in 1958. On the surface it looked like a good idea. NASA was founded as the successor to the 43-year-old National Advisory Committee for Aeronautics, which had forged a peculiar but effective partnership between government and the aircraft industries before and after World War II. This partnership had given the United States world leadership not only in military air power but in commercial aviation as well. So when NASA was founded, most observers assumed that a new aerospace industry would flourish just as the aircraft industry had.

But the optimists ignored a fundamental difference: The division of labor that had existed between government and industry in the development of airplanes was absent in the new spacecraft venture. The old formula had been simple: Government provided the seed money for basic research, then turned over production as well as commercial airflight to the private sector. Government did not mass-produce planes, private industry did (and even those companies did not operate airlines). Although the government did operate some planes, those operations were almost entirely military. The government did not directly compete with commercial airlines, and when possible it used commercial air services even for military passengers and cargo.

Space was different. NASA was chartered not only to stimulate space technology research, but actually to operate space missions. Indeed, to have what amounted to a monopoly on space missions. NASA was a direct competitor to the aerospace industry in every way. It was also their chief customer. Private companies made most of the rockets, but NASA flew them. Some of the most important rockets, including the Redstone that launched the first U.S. satellite, were even made in government factories.

Despite the panic caused when the Soviets launched *Sputnik* in 1957, by 1960 there were signs of healthy evolution in the aerospace industry, with private companies beginning to do internal research and making tentative proposals for privately operated rocket missions. Whether this would have resulted in the kind of public-private cooperation that gave birth to the aircraft and airline industries we will never know, because all that healthy evolution stopped with Apollo.

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There is a way for government to participate in developing technology. It worked well in the past, and could work again: X programs.

President Kennedy's announcement that the U.S. would put a man on the moon before 1970 was seen by most space enthusiasts, myself included, as a great event to be greeted with joy. We were going to the moon, government would pay for it, and the resulting stimulus would make America a spacefaring nation.

It didn't work that way. Instead, Apollo fed NASA, and NASA ate the dream. The first disaster was the mission plan: Rather than take an incremental approach—build a space station, then use it for on-orbit assembly of more advanced vehicles—an approach that would have built up a space infrastructure, Apollo was instead designed as a disintegrating totem pole which looked impressive for a moment but left nothing useful in space. It would do one and only one thing: put a crew on the moon and bring them home. That was the mission Kennedy had defined. It was the wrong mission.

The second disaster was Apollo's complexity: It was far too complex for private industry. The only organization with experience in operations as complex as D-Day was the military, and despite the fiction that NASA was a civilian agency, the military ran Apollo because the generals were the only people who could run it.

Which meant the military handled Apollo the military way: The mission was broken into smaller parts, and teams were assigned to each part. Then each of those parts was broken down. It worked splendidly, but the result was an enormous army of civilian scientists and engineers, some of whom had invested their entire professional careers in NASA and Apollo. Now when the military wins a war, you can disband the army and have the citizen soldiers go home to their regular jobs. But Apollo had built an army of civilians who had nowhere to go; NASA was their regular job.

Thus Apollo, a triumphant achievement but a disaster for orderly space development, was followed by Shuttle. Shuttle was far less triumphant. It wasn't on time, it wasn't within budget, and its turnaround capability—the ability to fly many missions in one year—was an unmitigated disaster. Shuttle has to be taken apart and rebuilt nearly from scratch after every mission. In one way, though, Shuttle met every expectation: it required an enormous array of development scientists and engineers. It was a full employment system for the Apollo standing army. Apollo/Shuttle is an excellent example of why government isn't much good at running industries it helps pioneer.

There is a way for government to participate in developing technology. It worked well in the past, and could work again: X programs. The X programs were outrageously successful in identifying and developing key aircraft technologies. There were X programs before the X-1 plane in which Major Chuck Yeager broke the sound barrier, but that is probably the most famous one. The X-4 Stiletto, the first airplane to take off from a runway and fly faster than sound, led directly to the Lockheed F-104 Starfighter, which dominated military airspace for more than a decade. And that's not even the best example of an X-program accomplishment.

In fact, the X programs were so successful that in the 1960s, Defense Secretary Robert McNamara closed them down—on the grounds that their achievements hindered our grand Cold War strategy, which was the relentless pursuit of arms control coupled with Mutual Assured Destruction. Powerful new technologies like the ones our X projects kept creating, McNamara believed, threatened the stability of Mutual Assured Destruction between the superpowers and would trigger new rounds in the arms race. Therefore, X programs had to go precisely because they worked so well. (I'm not making this up.)

So why did X projects work, and can they work again? They worked because their goal was limited: The ideal X project was one that took the best in off-the-shelf technology and pushed it to the limits, thereby identifying new technology requirements. Sometimes the new technology was found through experimentation within the X program. Other times the engineers went back to the drawing board and invented something that would overcome a limit found by the X craft. Each X project led to another, and as soon as this basic research turned up something that was ready for commercial development, it was passed on to private companies that could build production prototypes and then mass-produce finished vehicles.

The Mercury space program in the early 1960s was Spam in a can, just an agglomeration of existing technology, while the X-15 was a piloted winged craft that went to space and returned. Apollo, by contrast, led nowhere. Had the line of development leading through X-15 been pursued, we would now have true re-usable spaceplanes with turnaround times in hours to days, not Shuttle.

X projects worked because X craft were not production prototypes, they were research vehicles. The X-1 had no payload other than Captain Yeager and a stick of Beeman's gum. The X-4 was militarily useless. Instead they demonstrated capabilities and identified technology requirements.

X projects worked because you could not make a career from an X project. The typical program's life was short (around four years), with smallish, limited budgets, after which the team dispersed and the engineers and designers went back to apply what they had learned to real prototypes. X projects didn't build a standing army that had to be employed. X projects worked because they were learning experiences—for the engineers, for the flight teams, for the companies that built them, and for the nation as a whole. They stretched the technology envelope, and they did it on the cheap.

X projects can be done again. On the other hand, not everything called an X program is one. NASA's X-33 "Venture Star" spacecraft, currently being developed, isn't an X program. It's too large, and the goal is to build a prototype of an operational vehicle. Indeed, it is to be the operational vehicle. By contrast, the typical X program built three vehicles. We'd fly

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one until we crashed it. We'd apply what we'd learned from the crash to the second. The third was usually kept in the hangar, stripped for parts to keep the second one flying, and finally sent to a museum. But Venture Star is all or nothing, orbit or bust.

Real X projects fly incremental missions. The X-1 didn't break the sound barrier on its first flight. Neither did the X-4. Back in 1986 General Daniel Graham, Max Hunter, and I proposed the SSX spaceship, which was intended to be overbuilt. It would have been a miracle if it made orbit. The idea was to fly it, bring it home, and fly it again. Fly soon, fly often, then higher and faster. Find out where it was overbuilt and lighten it; fly some more, learn some more, and eventually nickel and dime it to orbit. Once that happened, we'd know how to build a real spaceship, like Buck Rogers had, one that flies to space, does things, lands, refuels, and flies again.

We can still do it. It's not too late. But the time to do it is now. Market forces are best for producing prototypes and operational vehicles, but if we want to be sure our grandchildren have the technologies needed to make America a spacefaring nation, we need real X projects. And we need them now.

Jerry E. Pournelle, Ph.D., is chairman of the Citizens Advisory Council on National Space Policy and author of science fiction classics.

THE RACE TO THE MOON

By Charles Murray and Catherine Bly Cox

Whatever its flaws, in its early years the Apollo program did operate far differently from the typical government bureaucracy. Some of the men responsible for that are profiled in Apollo: The Race to the Moon, *by Charles Murray and Catherine Bly Cox.*

Walt Williams was associate director for Operations of the Space Task Group. He was the "very tough kind of guy" the gentlemanly engineers needed to deal with the Air Force's brand of bureaucratic infighting. By 1959, Williams was already known in the flight-test business as a man who could work, carouse, cuss, or fight as prodigiously as any test pilot at Edwards Air Force Base. He was also tough in the other ways that Operations needed. "He had the ability to walk up to the problem of putting a man on top of one of these Atlas vehicles, which are really just big metal balloons, and not be cowed by it," said his colleague Glynn Lunney. "Williams just walked up and said 'Goddammit this' and 'Goddammit that' and got everybody saluting and doing what they should do." He was a genius of sorts, Lunney reflected, "though if you had to go up against him, he didn't seem like a genius, he seemed like a bull." In those days, he even looked like a bull—over 200 pounds, a powerful man with a square head, dark, close-cropped hair, and heavy brows.

But Williams was too busy negotiating with the Air Force and taking care of the preparation of the Atlas launch vehicle to handle the day-to-day business of flight control, Lunney said. "And then this young Kraft guy came along with a lot of clever technical skills and the charisma to pull it off. Chris made it happen."

His unlikely name was Christopher Columbus Kraft, Jr. As director of Flight Operations Division, he would become the embodiment of Mission Control and slowly shape Flight Operations into a brotherhood.

From 1959 until the mid-1960s, the new Division was continually hiring new people. But whereas other divisions within the Space Task Group hired a mixture of new college graduates and people out of industry, Flight Operations tended to hire predominantly new college graduates. Kraft looked for a particular kind of person. He wasn't worried about grades—a B or sometimes even a C average could be good enough. In fact, the straight-A student wasn't likely to be right for Flight Operations. Kraft wanted people who enjoyed nosing around in many different areas, and who knew that they were going to have to work hard. Most of all, he looked for applicants who were fascinated by space flight.

When these youngsters, 21 and 22 years old, came to work, they found themselves in one of the most glamorous jobs in the program. They didn't sit at drafting tables drawing electrical circuits or designs for valves; they were the guardians of the astronauts. They went to exotic places—Hawaii and Bermuda; Carnarvon on the northwest coast of Australia; Kano in the interior of Nigeria; Tananarive in the Indian Ocean; ships and islands throughout the world—to man the remote sites. They had as their leaders the redoubtable Williams, possessing everything to inspire awe in 21-year-old males but a silk scarf around his neck, and Kraft, who became the revered leader.

Kraft was the model for flight-controller cool, taking in bad news without changing expression or tone of voice, making decisions quickly, controlling people and events as the situation demanded. He had the indefinable quality called "presence" as well.

"People idolized Kraft, and wanted to be like him," another controller said. So there they were—young, male, in a high-pressure job, often the only one they'd ever known, many of them single, spending most of their waking hours together, often in remote overseas outposts, led by men they idolized. The result was more or less what one would expect of such a mix of circumstances—male bonding (a phrase no flight controller would be caught dead using) on a grand scale, and a kind of closeness that many of them would never know again. Along with the excitement went the hell-raising that groups of young men are prone to indulge themselves in.

They had their own language. While they were working a mission in the Control Center, they communicated in short bursts of acronyms and abbreviations and code words that made it impossible for an outsider to have any idea what they were talking about. After work, drinking beer at the Flintlock or the Singing Wheel, they would add to the acronyms and the jargon their own figures of speech. A Saturn didn't fly to orbit; it "went up the hill." One didn't make inquiries of someone; one "pulsed" him. Then, for reasons that remained unexplained, the controllers mixed their technological slang with medievalisms—"yea verily," for example, and "it came to pass," and "thou shalt." Sometimes it seemed that the controllers lacked only decoder rings and a treehouse.

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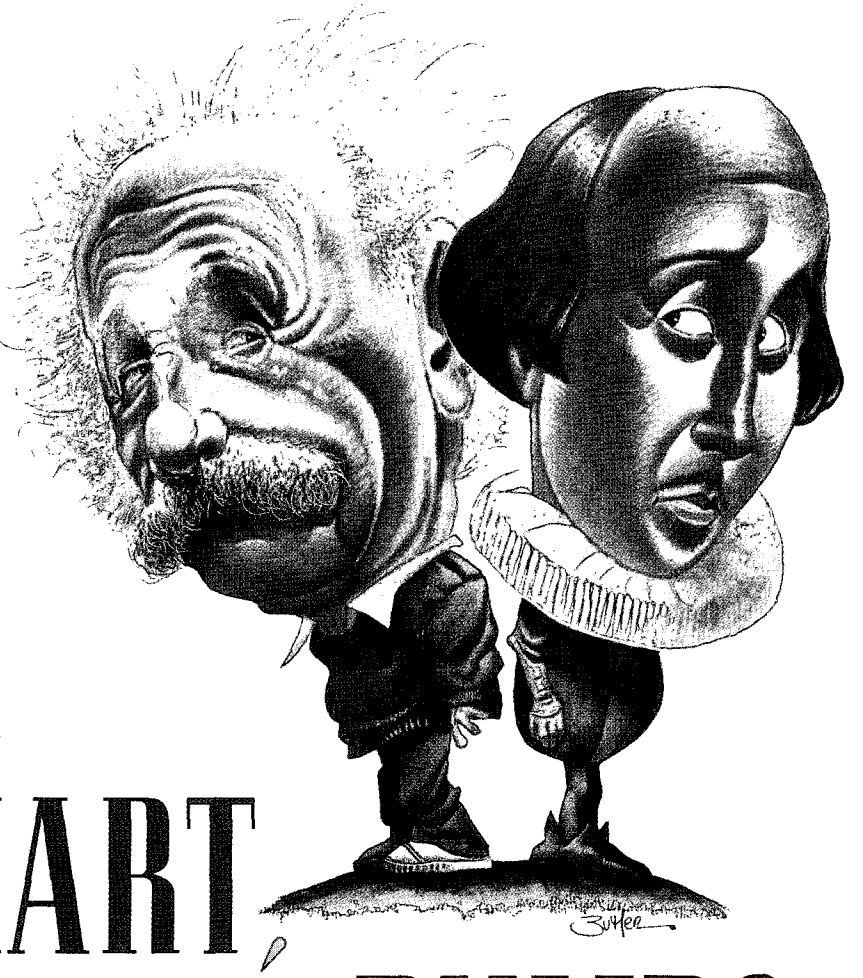

SCIENCE for the SMART, ENGLISH for the DUMB?

By Eli Lehrer

Erin Sharp published a half-dozen poems and several essays before she was graduated from high school. Her English teachers showered her with praise and awards. When she chose to go to Cornell University, her career choice was clear—medicine. "The assumption was that if you were smart enough to get into Cornell, you might as well become a doctor," she told *TAE*.

For Erin, medicine was a bad choice. She didn't like her biology and chemistry courses and found herself simply sliding through. After one term in college, she began to fill out an application for a transfer to Rutgers. Had she not met some new friends, she might have left. Good thing she didn't. By the end of the term, she had improved her academic prospects; her English professors loved her work and gave her *A*s. She decided to major in English.

Although Sharp found a place in the humanities after a not-so-great experience in the sciences, her case is an exception. Many bright, ambitious students find themselves working in the sciences rather than the humanities almost as a matter of fate. More and more teachers and students make the assumption that scientists and the sciences are somehow better than the humanities.

As a student in the humanities with a keen interest in science—I did upper-level work in astronomy and edited Cornell's science magazine—I learned that people expect students who can to go into the sciences. When I told my former cantor at synagogue that I was studying literature, his face turned pale. "I thought you would do something more"—he paused as his mouth began to form the word *useful*—"uh, scientific."

Indeed, as a result of priorities set by the federal government, the humanities' academic status has been declining relative to sciences since the end of World War II. Starting in high school, the best American students can look forward to a rich and challenging science curriculum supported by significant opportunities for research, paid summer jobs, and prestige.

High school students in the humanities can look forward to little of this. Even in the most privileged secondary schools the study of the humanities is of far poorer quality than the science instruction available at "second-rate" high schools. A close look at the curricula pursued by some of the country's best high-school students shows the great pressure they face to forsake the humanities for the sciences.

Ralph Butler

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STARTING IN HIGH SCHOOL, THE BEST AMERICAN STUDENTS CAN LOOK FORWARD TO A RICH AND CHALLENGING SCIENCE CURRICULUM SUPPORTED BY SIGNIFICANT OPPORTUNITIES FOR RESEARCH, PAID SUMMER JOBS, AND PRESTIGE.

I spoke with teachers and students of the humanities and science curricula at five prestigious New England prep schools (Loomis Chaffee, Choate-Rosemary Hall, Taft, Phillips Exeter, and Phillips Academy/Andover), as well as New York City's highly competitive Stuyvesant public high school. In addition, I looked at the upper-level work done at open-admission public high schools in Wilmette, Illinois, and Ithaca, New York. Comparing these curricula with course requirements at Cornell, UCLA, University of Illinois, Harvard, and Johns Hopkins, I found that even students at the finest secondary schools are not doing true college-level humanities work by the time someone hands them a high school diploma.

Although New England prep schools spend more per student than most colleges and have facilities that shame many small colleges, even in the best classes at the best schools students do work that is only slightly above the level of the freshman composition classes most colleges require. An advanced English course at Loomis Chaffee, for example, involved slightly more reading (but less writing) than a freshman composition class at Cornell. This is a clear change from the past: In the 1950s and early '60s, advanced English classes at Loomis Chaffee, Exeter, and Ithaca High School required a level of reading and writing roughly equal to college English courses.

None of this is to say that the prep schools teach poorly, just that the upper-level syllabi I looked at usually required less reading than college courses—roughly 100 pages a week as compared with more than 200 at the college level. And even the best students cannot be sure that they will read Shakespeare and Milton when they are in high school. No wonder teachers see some of the best humanities students slip away. "The students who do the best in our courses also tend to do well in just about everything else," explains Steve McKibbon, who teaches English at the Taft School in Watertown, Connecticut.

If, as seems likely, top students crave a challenge, they can find it elsewhere: The upper-level science and math courses in the prep and high schools I examined met or exceeded the requirements of college work. Advanced placement physics courses tended to use the same books that were used in college. Math courses were also good: Although the prep schools assigned slightly fewer problems, students spent more time in class. Moreover, high-school homework assignments are usually collected and graded, which is rarely the case in college.

The schools may not be wholly (or even partly) responsible for the gap between the curricula. In many cases, even the best schools simply follow the prescriptions of the College Board's Advanced Placement (A.P.) Program. A.P. exams, America's closest thing to a national testing system, measure ambitious high school students' ability to perform at the college level. A.P. curricula are set forth in short guidebooks that provide curriculum outlines in the humanities and specific lists of labs and concepts in the sciences. Humanities A.P. tests, particularly in English, concentrate on skills rather than specific knowledge. "We want to test things like close reading and vocabulary; that's what colleges want for freshman composition classes," says Wade Curry, the director of the Advanced Placement Program. "We don't look for any specific curriculum. We want to prepare people for the freshman writing requirements that colleges have. We try to follow the trends, not set them."

History tests do demand some specific knowledge. Yet a student could still attain the minimum score most colleges look for just by excelling on essay and document questions that require only a bare minimum of factual knowledge, while getting the overwhelming majority of factual questions wrong.

By contrast, each science A.P. test covers a very specific body of knowledge. The high school syllabi I examined showed a remarkable consistency in physics courses. They used the same books as colleges use and, on the whole, assigned just as much work as a student might have in an introductory college physics course. A few elaborate labs, it's true, aren't usually performed at the high school level, but the overall patterns are the same. Some math and science professors I spoke with did express doubt about some students' preparation, but they were an exception.

The focus on skills in the humanities *versus* actual knowledge in math and science leads to a predictable result: the math and science courses are simply better than the humanities courses. Educational research, time and again, shows that students learn less when skills are emphasized at the expense of knowledge. In *The Schools We Need and Why We Don't Have Them*, E. D. Hirsch sums up the conclusions of the last 30 or so years: "The only truly general principle that seems to emerge from...research on pedagogy is that focused and guided instruction is far more effective than naturalistic, discovery, learn-at-your-own-pace instruction." A professor at an Ivy League school who was once consulted on the A.P. humanities tests calls the exams nearly useless. "I'm just not sure what good they do. They don't test nearly enough," she says. "I don't pay attention to them myself."

The difference in pedagogical approach leads many, particularly at the high school level, to consider the sciences more "brainy" than the humanities, a view that continues over into colleges. In his influential 1959 book *The Two Cultures and the Scientific Revolution*, C. P. Snow argued that historians, classicists, and others in the humanities had a wholly different outlook from scientists. Writing in their 1994 book *Higher Superstition: The Academic Left and Its Quarrels with Science*, Paul

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Gross and Norman Levitt argued that Snow's prophecy had come true for many in the sciences who, for better or worse, were ignorant of the state of the humanities.

The situation may be far worse than what Gross and Levitt describe. As the National Association of Scholars demonstrated in 1994, core curricula have fallen by the wayside at colleges all over the country. There is, however, good reason to believe that many of the best humanities students, based on high-school experience alone, acquire a basic understanding of the important hard facts of science. The reverse cannot be said: Even the very best science students can almost entirely avoid serious coursework in the humanities.

Admittedly, it's also possible to avoid serious work in the humanities in many actual classes in the humanities. This is especially true at the college level, where humanities courses are often so intellectually trendy and politically correct that no thoughtful student can long endure them. But despite this all-too-common lack of academic seriousness, at least some evidence exists that the humanities are more "brainy" than the sciences. Study after study has shown that scores on the verbal section of the Scholastic Aptitude Test correlate more closely with I.Q. than do scores on the math sections. "The verbal parts of the tests are more oriented towards the things that people have to do in life. They aren't coachable in the way that the math sections might be," says Charles Murray, a scholar at the American Enterprise Institute.

Of course, the popular assumption that the sciences are "better" doesn't simply come from the Advanced Placement tests. To a large extent, it's a matter of federal policy. In the wake of Russia's successful launch of *Sputnik*, a strong emphasis on science became a cornerstone of federal education policy. Speaking to Congress shortly after the launch, Dwight Eisenhower said, "We must do what we can, here and now, to insure that we build a national scientific educational establishment second to none." Every President since Eisenhower has believed more or less the same thing.

Little wonder that humanities get short shrift at most colleges. Students have almost no opportunities for outside research; almost no funding is available for students to work as professors' research assistants or to follow their own projects in the humanities.

The disparity between the increases in science spending and flat or declining humanities spending has correlated with some interesting trends. Statistics compiled by the *Chronicle of Higher Education* and others show that between 1965 and 1995, the absolute number of students majoring in humanities fields like English, history, philosophy, and Romance languages increased less than half as fast as total high-school enrollments. In some colleges, the absolute numbers of students in these fields actually fell.

The private sector seems unwilling to do much to help the humanities. Unless one counts the almost always demoralizing exercise of spelling bees—where, as columnist Neil Stienberg has observed, "every kid but one turns out a loser eventually"—there are no humanities-oriented contests for high-school students or college students equivalent to the science fairs set up by nearly every school district in the country. Large corporations don't sponsor anything related to the humanities. The *Princeton Review's 1998 Scholarship Guide* lists fewer than 100 college scholarship programs with what one could call a humanities orientation, many of them quite limited in scope or extremely specific in selection criteria.

Programs at elite colleges also seem limited. "We had one person in the humanities last year, and it looks like he's heading toward computer science," said Lloyd Hall, the director of Cornell University's Presidential Research Scholars program, in a response typical of those who direct such programs.

Although federal money has played a significant role in the shift towards the sciences at every level, it is hardly the sole cause. Local schools get almost nothing from the federal government; so it is difficult to blame high-school trends on the federal government. Colleges, although far more dependent on federal money, could draw the line and require all students to complete heavy humanities curriculums. Likewise, wealthy individuals, corporations, and foundations would receive the same benefits or greater in terms of tax write-offs and social prestige if they spent more money sponsoring humanities education.

Until the late 1960s, few undergraduates did research in any area. Today, most science students graduating from top universities probably have helped out with some sort of research before they graduate. Yet it's true that some modern "research" experiences amount to little more than glorified clerical work. However, they still bring students into close contact with professors and, in many cases, replace what would otherwise be wholly non-academic work. Such exposure to a particular academic environment may make a large difference in what students end up doing later.

Of course, assisting in research is more problematic for students in the humanities. "I can't really send an undergraduate to the library to read an article because he might get something totally different out of it than I would," says Carol Kaske, an English professor at Cornell. "We can't do undergraduate research the same way they can in the sciences."

Finances may also influence students' paths of study. And science students, it is true, do earn higher wages right after graduation, something which might be important to those with large student loan debts. Still, wages tend to equalize after a few years. In *The Cream of the Crop: The Impact of Elite Education in the Decade After College,* Herant Katchadourian and John Boli conclude that students who go to elite schools achieve financial and personal success based more on internal characteristics like X and Y than on intellectual curiosity and desire for money. "Their futures depend on how they order their priorities," the authors write. The real challenge may be figuring out how to arrange high school and college work so as to put the humanities and the sciences on an equal footing, accord them equal prestige, and give the best students opportunities of the same intensity.

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In Real Life

FIRST-PERSON AMERICA

SAVING LIVES WITH DDT

By Joseph J. Jacobs

PASADENA, CALIFORNIA—Rachel Carson's 1962 book *Silent Spring* is the bible of today's eco-activists, though it is unbalanced and scientifically suspect in many areas. I happen to have a personal interest in the main focus of her attack: the now-infamous insecticide DDT. During World War II, as a recent Ph.D. in chemical engineering, I went to work for Merck and Company. I was asked to develop a commercial process to manufacture a sensational, secret, microbiologically produced germ-killer (antibiotic, as it was later classified). It was called penicillin.

Another highly secret product I had to devise a way of manufacturing in large quantities had originally been made by a Swiss chemist in about 1865. It had a long chemical name that I shortened to DDT. I was not told what it was to be used for. I was just given the reference to the original laboratory procedures and asked to mass produce it in a short time. I worked diligently, culminating in a 48-hour round-the-clock stretch that successfully produced the first 500-pound batch of DDT ever made.

During that final push to make the 500 pounds, a valve on one of the vessels broke, and I was covered head to foot in a two-inch coating of pure DDT. I'm sure I swallowed a lot as well. But I took off my work clothes, showered, and finished my assignment.

The next day the drums of this product I had so laboriously produced were picked up by U.S. Army trucks. Two weeks later, Merck received a message from the Surgeon General of the Army thanking all those who produced those 500 pounds of DDT. It had been shipped by air to Italy, where a typhus epidemic was raging among our soldiers, who were already in enough danger. Typhus is a deadly disease spread by body lice in soldiers' uniforms. DDT is absolutely lethal to body lice. They dusted it in the soldiers' uniforms, and the epidemic was stopped in its tracks. In his message, the Surgeon General estimated that 5,000 soldiers' lives were saved.

THE WORLD HEALTH ORGANIZATION ESTIMATES MORE THAN 5 MILLION LIVES WERE SAVED BY DDT DURING ITS FIRST EIGHT YEARS OF USE.

When Rachel Carson made her claims, did anyone try to track those thousands of U.S. soldiers who dusted their clothes with DDT and lived in daily contact with it for months to see if any developed cancer? And if some soldiers had, would it have been prudent, I wonder, to refuse to use the DDT and allow those soldiers to die of typhus?

And stopping typhus is just the tip of the iceberg as far as lives saved by DDT. Before its advent, Sri Lanka suffered 2.5 million cases of malaria a year, 25,000 of them were fatal. Using DDT to wipe out the anopheles mosquito lowered the cases to 110 in just a few years. The World Health Organization estimates that more than 5 million lives were saved by DDT during the first eight years of its use.

A study by Edward Laws of Johns Hopkins University found that workers exposed to high levels of DDT for 10 to 20 years developed no cancer. Walter Ebeling, a UCLA entomologist, says "probably no other compound, not even penicillin, has saved as many lives."

I am not aware of any human fatalities linked to DDT. On the other hand, penicillin, the other great chemical I am proud to have helped bring to commercialization, has caused quite a few deaths from allergic reactions. Yet no one has ever bemoaned the discovery of penicillin or suggested it be banned.

People know there is risk in life. They face it every day. But some arrogant elitists in our society prefer not to let people make their own choices. They constantly warn us of dangers and frequently exaggerate them. Rarely, if ever, do they balance those against the benefits of "dangerous" substances. The result has been enormous costs to our society.

Dr. Joseph Jacobs is founder and chairman of the board of Jacobs Engineering Group, and author of The Compassionate Conservative *and* Anatomy of an Entrepreneur.

BETTER FARMING THROUGH CHEMICALS

By Blake Hurst

WESTBORO, MISSOURI—Every summer I would hear the grinder in the shop start up, and I knew my tormentors (in the person of my grandfather and father) were sharpening the garden hoes. Until the last couple of seasons, we spent several weeks each summer cutting weeds out of our soybeans by hand. I can remember studiously avoiding the discussion of weeds and soybeans, and instead mentioning all the other tasks we needed to do, hoping the management of Hurst Farms would somehow not notice the weeds popping up above the soybeans. But to no avail: All too soon, the hoes would appear.

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The Hursts were the only local farmers to use sharpened garden hoes to "walk beans." Our neighbors used corn knives (machetes) or bean hooks. But hoes were what Grandpa used to walk corn in the 1920s, and they were good enough for us. I was never very happy when Grandpa lined up our bean crew and we started down the first rows, but my grandfather handled my displeasure with the kind of equanimity that comes from spending 60 years supervising his son, his three grandsons, and innumerable hired hands.

We applied herbicides to our soybeans and cultivated them with a tractor, sometimes twice, but it wasn't enough. There were always some weeds that survived mechanical and chemical warfare, and the only way to avoid the disapproval of all passing agriculturists was to cut the weeds with a hoe. I hated that job with every bit of passion I could muster.

Most of our neighbors started early in the morning and knocked off around noon, doing other tasks during the hottest hours of the day. Not us. We started at 7 A.M., took an hour off for lunch, and worked till 6 P.M. Our biggest weed problem was wild sunflower. Not the emaciated, spindly excuse for a flower that my wife insists on growing in the garden, but massive specimens that grow 12 to 14 feet tall with thick, woody stems.

We spread out across the field, my brother and I separated by my father and grandfather. There were two reasons for splitting the younger members of the crew. First, safety: In order to cut through weeds as thick as our arms, the hoes were sharp enough to cut paper. With a four-foot-long handle, one could generate quite a bit of leverage. The thought of two boys swinging wildly in adjacent rows no doubt caused my dad to imagine yet another trip to the emergency room. The second reason was efficiency. My brother Kevin and I were fairly trustworthy early in the morning. But a lot of our rows are nearly a mile long. A round would take upwards of three hours. As we neared the pickup and more importantly the water jug at the end of a round, we tended to miss a few weeds because we were near death from lack of water. Grandpa and Dad would pick up the slack, but only so much. To get too far ahead in the rush to water was a cardinal sin, and it was considered very bad form to be sitting on the tailgate of the truck, draining the water jug, while your elders were cutting the rest of the weeds in your rows.

Grandpa cut weeds until he was in his eighties. Walking beans was a wonderful way to learn how to work, and I'll never forget the hours I spent beside my father and grandfather in the bean field. Without realizing it, my brothers and I received a thorough education about our profession from the stories our elders told while whaling away at sunflowers, buttonweeds, and horseweeds. I wouldn't trade that experience for anything, but that doesn't mean I miss walking beans.

UNTIL THE LAST COUPLE OF SEASONS, WE SPENT WEEKS EACH SUMMER CUTTING WEEDS OUT OF OUR SOYBEANS BY HAND.

Three days ago, my brother Brooks sprayed the very weedy soybean field behind my house with our newest acquisition, a 200-horsepower, full-time-four-wheel-drive sprayer that takes a 60-foot wide swath through the field. The sprayer has radar speed control, computer controls that match the spray rate to ground speed, and monitors that compute ground speed, spray rate, pressure, gallons of spray per acre, and with just a little tweaking, would probably fill out our tax forms. Brooks travels through the field in air-conditioned comfort, listening to the radio, and in contact with his tender truck through his radio and his cellular phone. A long ways from a hoe and a water jug.

But the real breakthrough is the fact that this new sprayer is spraying the herbicide Roundup directly on our growing soybeans, which are genetically engineered to be unaffected by it. The weeds are already dying, the soybeans are thriving, and no one will spend any time in this field again until harvest. Genetic engineering has made it possible to use the extremely effective Roundup on soybeans, and cotton, and next year corn, and it has changed farming forever. Nearly half of all soybeans in America are "Roundup ready," only three years after the introduction of the technology. The beans have fewer weeds than ever before, and bean walking is a lost and unlamented art.

Genetic engineering has benefited us in other ways. It is impossible to drive through the Corn Belt after dark during July and August without gradually losing visibility because of thousands of corn borer moths committing *seppuku* on your windshield. It is not unlike driving through a snowstorm. Corn borers cause corn to fall down before it can be harvested. Insecticides are available, but they are not always effective and are always expensive. The first results from corn genetically engineered to resist corn borers are in, and yields are showing an increase of 10 to 20 percent without the cost or environmental risk of an insecticide treatment.

Not everyone is as happy about genetic engineering as I am. In fact, Greenpeace flew in a bunch of European protesters in white suits and gas masks to destroy a research plot of Roundup-ready soybeans a few miles north of our farm. Local farmers were bemused, and somehow I have trouble envisioning urban environmentalists with sharpened garden hoes in their hands.

In fact, the widespread adoption of this new technology will benefit the environment. Roundup is environmentally benign and allows us to grow crops without disturbing the soil by tillage. This reduces erosion by 80 percent or more, and erosion is easily the most serious environmental problem faced by farmers. We now keep fertilizer, and herbicides, and most importantly topsoil, our most valuable resource, in our fields instead of polluting our rivers and streams. And that is even better news than the demise of bean walking.

Blake Hurst is a regular contributor to TAE.

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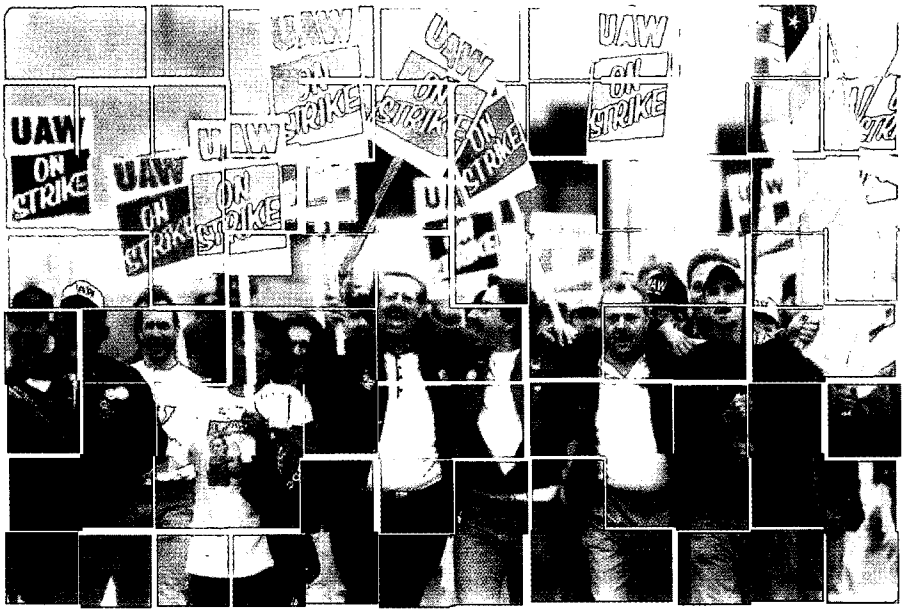
the Labor Economist

Vanishing Unions

By Kevin Hassett



Members of UAW Local 659 walk off the job Friday, June 5, as a strike is called at the Flint Metal Center.

Associated Press, THE FLINT JOURNAL

Are America's unions committing suicide? The organized labor movement as we know it started shortly after an 1842 Massachusetts court decision declared that strikes were not criminal conspiracies. Over the next 80 years, the unions could command considerable sympathy. When almost 400,000 workers went on strike in 1919—shortly after the American Federation of Labor organized much of the iron and steel industries—the conditions the workers sought to improve were appalling. Many worked 12-hour days, seven days a week, often in hot and dangerous conditions. While one can object to the actions of the famed Molly Maguires, a group of Irish coal miners who terrorized Pennsylvania's coal companies in the 1800s, the fact that working conditions could lead men to such desperate acts should disturb any observer.

Against this sobering backdrop, the latest United Auto Workers strike at GM is pure farce. Most of GM's North American production has ceased, following a strike at their Flint, Michigan metal fabricating center. One of the chief disputes is GM's objection to outdated piece-work rules that, combined with improvement in assembly-line efficiency, mean that workers often quit after a half-day of work with full pay—which averaged $69,000 last year, plus $29,000 of fringe benefits, the *New York Times* reports.

GM argues that such expensive labor practices drive up the cost of GM cars, which in turn could eventually drive the company out of business. Historical evidence suggests GM has a point: Firms and industries where organized labor has significant power have experienced a steady decline since the 1950s, while those sectors not controlled by unions have blossomed, benefiting labor and management alike. The net result has been one of the more dramatic reversals in U.S. economic history. According to data from the U.S. Bureau of Labor Statistics, the percentage of the private workforce that is unionized climbed from about 6.8 percent in 1930 to about 27 percent in the early 1950s, but then declined to below 10 percent by 1997. Twenty more years of this trend would, as the nearby chart shows, take the percentage of private workers unionized to zero! (Unionized government workers are another story. In this sector, not known for watching costs or improving efficiency, union membership is growing.)

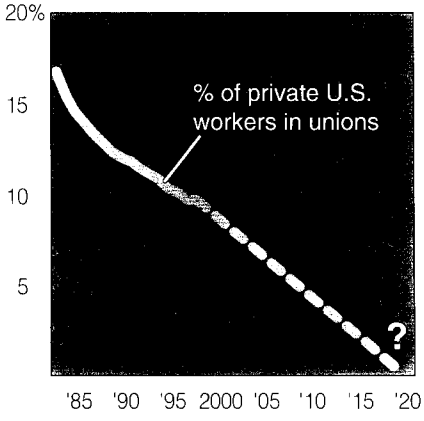
So why has unionization in the private sector declined? Economists who study unions point to several factors. The first piece of the puzzle is the effect of unions on the way workers are used and paid. Unionized workers earn, on average, about 15 percent more than nonunionized workers, according to a National Bureau of Economic Research study. Unions also negotiate with firms to create rules that are intended to improve working conditions. The piece-rate rules at the Flint plant are just one example.

Many union supporters argue that this negotiating power is valuable, because otherwise large firms would hold disproportionate power over workers. In the blind pursuit of profits, the argument goes, capitalists wring every last ounce of effort out of workers, without regard to the workers' welfare.

On the other hand, higher wages and stricter work rules put an enormous burden on firms. Labor costs are a very high share of total costs for most firms. Take the average U.S. firm, increase its labor costs by 15 percent (as unionization typically does), and almost all of its profits would be eliminated.

What happens to a firm if unions force it to pay more for labor than its competitors pay? If the firm has a monopoly on its product, then it can simply pass the higher costs on to consumers. But if many other nonunionized firms sell exactly the

America's disappearing unions



Source: U.S. Bureau of Labor Statistics, with author's extrapolation of current trends.

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same product, then the unionized firm may well go bankrupt quickly. In the real world, most unionized firms are, like GM, somewhere in between. They have significant market power, so there is some chance they can survive even when their costs rise; but they do not have so much market power that they can ignore the possibility of losing sales to competitors. For such a firm, the ability to adjust in order to maintain competitiveness is critical for its long-term survival. Yet not only do unions raise labor costs, but employers also complain that union rules make it difficult to adapt to changing technologies and market conditions.

Studies of the practices of unionized firms reveal the second clue to unions' demise: Firms are generally unable to overcome the costs of unionization. If unionization were a disease, it would be one for which there is no cure. Economists have investigated two potential avenues of adjustment: Unionized firms could purchase more machines, or they could expand by buying nonunionized firms outright. Neither approach seems to work.

Buying more machines has an intuitive appeal. Since unions increase wages, unionized firms could, in theory, automate their way to lower costs and thereby at least partly overcome the higher costs of union wages. In an article in the *Journal of Labor Economics*, Federal Reserve Economist Bruce C. Fallick and I show that this strategy has not helped U.S. firms. For when more efficient machines increase a firm's profits, unions increase their wage demands commensurately, in effect taxing away the profits from the machines. Because of this union "profit tax," unionized firms are in practice *less* willing to purchase new machines than nonunionized firms. How much less? We found that firms generally lower investment by about 30 percent when their workers are unionized—not a recipe for growth.

Alternatively, unionized firms have been accused of acquiring nonunion firms to get around higher wages and union work rules: If your plant in Massachusetts organizes, buy a firm that operates in Mississippi, and threaten to transfer work to the southern plant the next time you bargain with the Massachusetts union. Organized labor has pushed this scenario for some time. In testimony before the Senate Finance Committee in 1989, for example, AFL-CIO president Lane Kirkland claimed that 90,000 union members had lost their jobs in the previous decade because of such takeovers.

THERE IS LITTLE FIRMS CAN DO TO OVERCOME THE COST DISADVANTAGE IMPOSED BY HIGHER UNION WAGES.

The facts do not agree. In another recent paper, Fallick and I look at a large sample of U.S. mergers and show that union firms almost always merge with other unionized firms, while nonunion firms almost always merge with nonunion firms. Why is the pattern the opposite of the unions' claims?

A simple example illustrates the problem faced by a union firm. Consider a convenience store with a nice location, nonunionized workforce, and a market value of a million dollars. What would happen to that value if the workers unionized? It would go down. Higher labor costs would lower current and future profits, and a buyer's willingness to pay would also decline. Now if a unionized firm looks at a nonunionized convenience store, it will worry that its union will spread to the new firm. Shortly after paying a million dollars for the new store, the spread of the union would significantly lower the new property's value. If the firm buys a unionized store, however, the union is already there, and there is less of a chance the asset will decline in value. This contagion effect is decisive, we found, which means that extracting concessions by transferring work to a nonunionized workforce is not an option for most employers.

The final potential adjustment for a firm is to outsource production either to nonunion suppliers or overseas. This strategy may well help the company survive, but it doesn't do much to ensure the survival of unions in America.

So it is easy to see why, in retrospect, the number of union employees in America has gradually declined. There is little firms can do to overcome the cost disadvantage imposed by higher union wages. If they try to modernize to increase productivity, unions increase wage demands. If they try to purchase a competitor's plant that operates more efficiently, the union spreads to the new plant and makes it less efficient.

American workers seem to understand this, which is the final piece of the declining unionization puzzle. After witnessing such disruptive absurdities as the GM strike, most Americans want little to do with unions, and efforts to unionize new plants are rarely successful. Indeed, a recent paper by Henry Farber and former Clinton administration economist Alan Krueger documents a striking decline in the demand for unionization by America's workers. Farber and Krueger hypothesize that Americans no longer want to be unionized because workers are more satisfied with their jobs and less convinced that unions provide valuable services.

When workers were working 12 hours a day, seven days a week over hot furnaces, the union movement had the moral high ground. When America's capitalists wised up, wages and working conditions became reasonable, and workers began to look critically at what unions accomplish. Rather than work to be constructive in the new environment, unions continued old strategies that were unreasonable, confrontational, and ultimately self-destructive. As unionized firms withered on the vine, America's workers recognized that unions' addiction to short-term gains ultimately carries a high long-term cost.

Unless union strategies change dramatically, recent trends will continue, and America's private-sector unions will be an interesting footnote in our grandchildren's history classes. Since union leaders never adjusted their approach to a changing world, the death will go down as a suicide.

Kevin Hassett is a resident scholar at the American Enterprise Institute.

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Flashback

TO KNOW NOTHING OF WHAT HAPPENED BEFORE YOU WERE BORN IS TO REMAIN EVER A CHILD—*Cicero*

Alaska + Hawaii = Puerto Rico

After four decades of statehood for Alaska and Hawaii, what do we have to show for it? The Iditarod, countless bad puns about getting lei'd, and a sweatshop Betsy Ross stitching a fifty-first star for Puerto Rico.

We can't say we weren't warned.

A chorus of reactionaries and wise liberals, from Senator William Fulbright to Columbia University President Nicholas Murray Butler, cautioned that admitting non-contiguous states—abandoning the "united" part of the United States—would be venturing down "the road of empire," as Senator James Eastland (D-Miss.) said. "If we go down this road…there will be no turning back." To Butler, bringing in Alaska or Hawaii "would be the beginning of the end of our historic United States of America…. We now have a solid and compact territorial Nation bounded by the two great oceans, by Canada, and by Mexico. This should remain so for all time."

Appeals were made to the shade of Daniel Webster, who in 1845 argued, "There must be some limit to the extent of our territory, if we are to make our institutions permanent. The Government is very likely to be endangered…by a further enlargement of its already vast territorial surface."

For it was "folly," said Representative Jones (D-N.C.) of the Hawaiians, "to believe that these people some 5,000 miles from Washington" can possibly "be imbued with the national spirit."

Hawaii was no stranger to this charge. Years earlier the anti-imperialist Missouri Senator Champ Clark asked, "How can we endure our shame when a Chinese senator from Hawaii, with his pigtail hanging down his back, with his pagan joss in his hand, shall rise from his curule chair and in pidgin English proceed to chop logic with *George Frisbie Hoar* or *Henry Cabot Lodge*?" Poor Champ didn't know the half of it: Instead of an exotic Chinese logician we ended up with Senator Dan Inouye pawing beauticians.

While the hacks of both parties sorted out the partisan implications of statehood—Hawaii was to be Republican and Alaska Democrat, a perfect flip-flop of how things came to be—the ralliers around the Old 48 achieved a desperate, plaintive eloquence. Congressman James Donovan of Manhattan's East Side begged his colleagues to "consider what happened to the pristine virtues of the Roman Republic when it started to take in the Senator from Scythia, the Senator from Mesopotamia, the Senator from Egypt, the Senator from Spain, the Senators from Gaul; yes, even the Senators from England. What happened to Roman culture? What happened to Roman unity?"

LINCOLN, NO LOVER OF STATEHOOD FOR TEXAS, "DID NOT BELIEVE IN ENLARGING OUR FIELD, BUT IN KEEPING OUR FENCES WHERE THEY ARE AND CULTIVATING OUR PRESENT POSSESSION, MAKING IT A GARDEN."

Congressman William Wheeler (D-Ga.) predicted that "in a few years, if we follow the precedent we seem to establish here," the House would teem with "the gentleman from Guam, the gentleman from the Virgin Islands, the gentleman from Liberia, the gentleman from Israel…I have grown up thinking that this is the United States of America, not the United States of the entire globe."

Representative Kenneth M. Regan (D-Tex.) lamented, "I fear for the future of the country if we start taking in areas far from our own shores that we will have to protect with our money, our guns, and our men, instead of staying here and looking after the heritage we were left by George Washington, who told us to beware of any foreign entanglements. I think he had this outpost in the Pacific Islands in mind at that time."

But a handful of Southern Democrats and Taft Republicans could not save the flag from its forty-ninth and fiftieth stars. Or, they feared, another constellation's worth down the road. The eternal Senator Strom Thurmond, whose hair was a bit grayer back then, warned, "Once these two Territories are admitted to the Union, the precedent will have been set for the admission of offshore Territories which are totally different in their social, cultural, political, and ethnic makeup from any part of the present area of the United States. Would we then be in a position to deny admission to Puerto Rico?"

Perhaps not. Abraham Lincoln, no lover of statehood for Texas, explained that he "did not believe in enlarging our field, but in keeping our fences where they are and cultivating our present possession, making it a garden." My, how that garden does grow. Tundra here, sugarcane there…and maybe even a little patch of corn and pumpkins, just for old time's sake.

—Bill Kauffman

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The Leatherneck Behind "JAG"

Donald P. Bellisario doesn't fit this town's typical mold. Hollywood has few ex-Marines and fathers of seven running prime-time network series.

Bellisario, 63, brings an unusual approach to the military as the creator and executive producer of the CBS action drama "JAG," which starts its fourth season this fall.

Typically, the post-World War II military is second only to business as the profession most often maligned in scripts. The series "M*A*S*H" used the Korean War for an anti-military message for more than a decade. Films take the Cold War soldier a step further. He's a psychopath (*Casualties of War, Platoon*), or, once the war is over, has so many demons haunting him it's impossible to adjust to civilian life (*Coming Home, Heaven and Earth*). America's winning the Cold War hasn't changed things much. The Marines in 1992's *A Few Good Men* are anti-Communist fanatics who thumb their noses at the rule of law after causing the sinister death of another Marine.

But Bellisario, who didn't start in this business until he was 41, doesn't subscribe to this curious brand of Duty, Honor, and Country. He has more respect for the military and sees it as vital in keeping the peace. "JAG" chronicles several elite naval officers who, as Judge Advocate General Corps lawyers, investigate, defend, and prosecute those accused of crimes in the naval services. It features characters whose actions are chiefly driven by morality and the high standards of their profession. "I've had this love for the military because I believe in that code," says Bellisario, sitting in his office on the Paramount lot. "And I'm not liberal, left-wing Hollywood. What I'm trying to do here is show that the values of middle America are the same values that we have in the military."

Network executives were initially reluctant to sign off on his scenario. For Bellisario, this was *déjà vu*. In 1980, he pitched an idea for a series about a Vietnam vet that executives didn't think would work. "Everybody's attitude was, Oh, God, don't touch Vietnam. Stay away from that whole war; it's going to turn people off," Bellisario recalls. They were wrong: the idea turned out to be "Magnum, P.I.," starring Tom Selleck as an Annapolis graduate and Vietnam hero. "It was the first time vets were being portrayed as normal human beings who had come back to live useful lives," says Bellisario. "Until then, a Vietnam vet was always some guy who was shooting up drugs, killing people, or a paraplegic on a corner. We changed that image in 'Magnum.' I'm just kind of continuing that now."

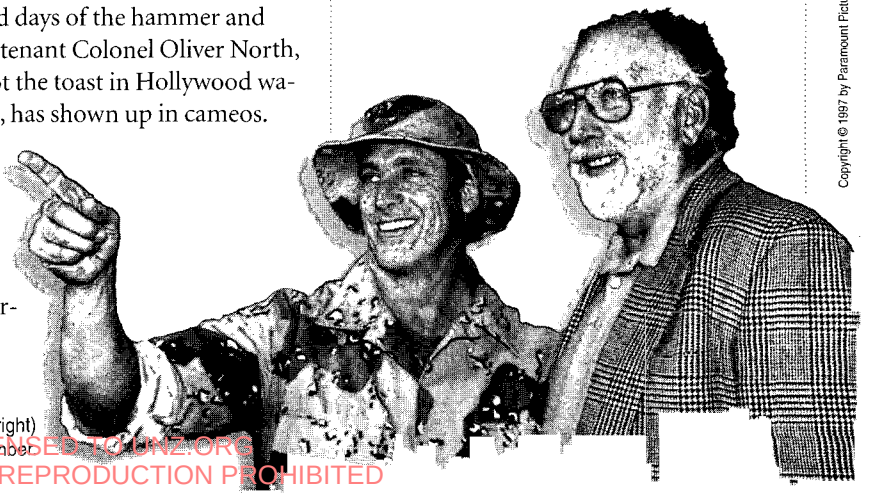
In the post-Cold War era, that job is always demanding, but Bellisario has fun taking jabs at some of the Left's sacred cows. One episode last year hinged on whether the main character's father, listed as missing in action in Vietnam, was alive and under KGB control in Russia. Another, about the attempted assassination of the princess of Romania, described the culprits as "hard-line extremists longing for the good old days of the hammer and sickle." Lieutenant Colonel Oliver North, certainly not the toast in Hollywood watering holes, has shown up in cameos.

Don Bellisario and his four writers also gave an interesting twist to the popular military cover-up theme when they had a State Department politico tampering with evidence in order to protect Washington careers. The same originality appears in episodes inspired by the sex scandals that have plagued the Navy. One episode, for example, showed a sexual harassment case where the charge turned out to be false. "A man can go through 35 years of honorable service and dedication to his country, turn around and make one misstatement, and it's all over," Bellisario says "We've lost more admirals and generals to political correctness in the last several years than on any battlefield since the Revolutionary War."

"JAG" also took on a story inspired by Lieutenant Kelly Flinn, the B-52 pilot charged last year with lying about her affair with the husband of an enlisted woman. Bellisario's version dramatized the rationale for Flinn's court-martial. "Many people who don't know about the military read that a female is being charged because she fell in love with somebody. But it's not about a woman and her love affair; it's about obeying and disobeying orders, and that's what I tried to bring into the show we did."

While most script writers would probably use Flinn's case to tell a story about how the military isn't keeping up with the "enlightened sexual awareness of the '90s," Bellisario instead went for a more challenging message about personal responsibility, a theme that runs through many episodes. "We have a kind of no-fault life going on right now," he says. "If we do something wrong, we can blame our parents, the government, or somebody else, and don't have to take responsibility for our own actions. I try to make the other case."

— John Meroney



Donald P. Bellisario of "JAG" (right) with a crew member

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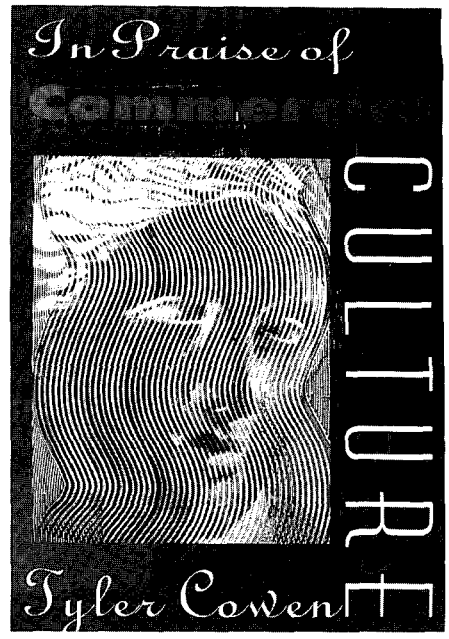

MONEY IS THE ROOT OF ALL ART

By Paul A. Cantor

In Praise of Commercial Culture
By Tyler Cowen
Harvard University Press, 278 pages, $27.95

Capitalism has proven to be the most materially productive economic system ever devised, and thus left-wing criticisms of capitalism have become increasingly cultural in their targets. If capitalism cannot be faulted for failing to deliver the goods, the goods can be faulted for being too crassly commercial.

In a wide-ranging, brilliant, and thought-provoking book, Tyler Cowen has come to the cultural defense of capitalism. He argues that the record of free markets in supporting culture can stand comparison with that of any other system, from feudalism to communism. For every medieval monarch or Soviet bureaucrat who turned out to be a tasteful patron of the arts, Cowen identifies scores of middle-class merchants who have been equally adept at singling out talented and creative artists for encouragement. He also shows that many of the greatest creators have been more financially astute than the Romantic myth of the impoverished artist would have us believe. Indeed, after reading this book I found myself thinking that if the classical composer had actually heard the phrase "Roll over, Beethoven," he would have regarded it as advice on what to do with his Bank of Vienna certificates of deposit.

Cowen is amazingly learned, both in scholarship about the arts and in the arts themselves. He moves effortlessly from painting to music to literature. He also navigates skillfully between high and low culture, whether he is comparing the great piano virtuoso Franz Liszt to a contemporary stage performer like Prince, or showing how the second part of *Don Quixote* follows the same logic as do movie sequels like *The Empire Strikes Back* or *Terminator 2*. Cowen uses his learning to document how much of what we now think of as the high culture of the past was in fact nourished by capitalist or at least proto-capitalist economic environments.

Cowen shows, for example, that the nascent capitalist world of fifteenth-century Florence helped spark the miracle of Quattrocentro painting. Flourishing businesses like jewelry-making provided not only wealthy customers, but also the new materials and training in craftsmanship that helped great artists from Botticelli to Leonardo achieve the artistic innovations that still astonish us. Cowen makes it clear that capitalism is not a sufficient condition for producing great art, but he does show in what ways it often provides the *necessary* conditions. Painting as an art, for example, seems for many reasons dependent on wealthy cities for its existence and progress, and as Cowen points out, nothing is better than capitalism at generating urban wealth. Florence, Amsterdam, Paris, New York: It is no accident that the history of painting is inseparable from these urban centers of capitalism. Cowen's discussion of how the middle-class wealth of seventeenth-century Amsterdam contributed to the development of painters like Rembrandt is particularly revealing.

Left-wing critics of capitalism are always complaining about the way it commodifies art, but as Cowen shows, sometimes commodification can be a good thing. The very idea of a painting as we know it today was originally a clever commercial idea, a way of turning an artist's work into a marketable commodity that could easily change hands. The detachable painting, framed and sold in a gallery, allowed artists to reach a wider public and thereby freed them from subjection to ecclesiastical and aristocratic patrons. Painting something immovable like a church altar or a palace wall, an artist was inevitably limited in his subject matter by the site; the ready portability and hence marketability of oil paintings on canvas allowed artists to explore a remarkable new range of subjects, including the Dutch still lifes and the domestic interiors of Vermeer we prize today.

Cowen similarly shows that many of the great advances in literature were sparked and fueled by middle-class markets. The Victorian novel was a thoroughly capitalist enterprise and indeed quite a money-making business for a successful author like Dickens. Radical critics complain about the constraints a paying public places on artists, and yet the Victorian novel perfectly illustrates how the need to please an audience kept nineteenth-century authors on their toes, working both to exploit popular genres and to innovate in narrative technique. Cowen reminds us that the greatest of all

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authors, Shakespeare, also wrote for a commercial market, and the Elizabethan theater proves again that great artistic achievement is compatible with money-making as a motive.

Left-wing literary critics today, above all the so-called New Historicists, are always trying to document how canonical authors have been implicated in the world of capitalism, supposedly serving the rich and powerful. These neo-Marxist critics do not realize the irony of their position. They think that if they can show that Shakespeare was bound up with capitalism, they have come up with an argument against Shakespeare, but in fact they have unwittingly provided an argument for capitalism. At the very least, they cannot have it both ways: They cannot complain that Shakespeare was a creature of capitalism and that capitalism is incompatible with high culture.

In a brief review, I cannot give a full sense of the richness, power, and sheer novelty of Cowen's argument. I can only urge everyone to read the whole book and learn, for example, why payola for pop music deejays was a good thing, or how Cowen thinks government bureaucracy can actually serve the cause of art (hint: By providing cushy civil service jobs to men like Nathaniel Hawthorne, the U.S. government unintentionally helped finance the American Renaissance).

In only one respect do I quarrel with Cowen: Sometimes he takes his arguments too far. Most of the time, Cowen argues only that capitalism is roughly as good as any other economic system in encouraging culture. That is all he really needs to prove: If capitalism is clearly superior to its rivals as an economic system, and it also is not inferior in its effect on culture, then capitalism trumps feudalism, theocracy, socialism, communism, and any other system one cares to name. But sometimes Cowen feels compelled to show that capitalism is simply and unequivocally superior to any other economic system in its cultural effects. Even here he may be right, but this turn in his argument involves him in some questionable claims. He feels it necessary to defend almost all of contemporary American culture, including some backwaters of popular culture and the avant-garde in painting and music. In fact the history of many contemporary artistic movements reveals the negative effects of freeing artists from commercial pressures. Retreating into the world of academia and foundation or government grants, many contemporary artists have lost touch with any meaningful audience, and their art has become sterile as a result.

Cowen could be more critical of contemporary developments in the arts and still sustain his overarching thesis about the cultural power of capitalism. And it is this thesis—and the verve and wit with which Cowen makes his points—that should shake up contemporary cultural debates, and above all the question of government support for the arts. This is a very important and original book.

Paul Cantor is professor of English at the University of Virginia.

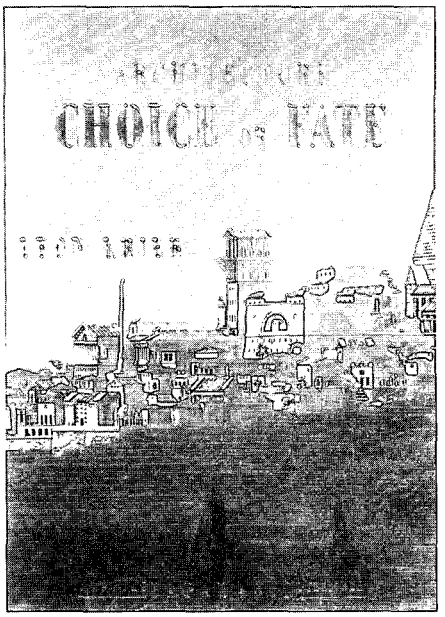
THE MODERNIST PRISON

By James Howard Kunstler

Architecture: Choice or Fate
By Leon Krier
Andreas Papadakis, 224 pages, $39

Anybody who is distressed by the "fiasco of suburbia" that has become the everyday setting of American life will find illumination in Leon Krier's compelling polemic on the current state of Western architecture and urbanism. Krier's message is heroically redemptive: We can choose to live in better surroundings than the universal automobile slum of our time. We don't have to remain captive victims to failed ideologies. There are enduring values in the art of building that are our natural legacy as human beings, and we are free to reclaim them.

Krier may be best known to Americans as the architect behind the Prince of Wales's new town of Poundbury in Dorset, England, and as the intellectual godfather of the New Urbanism movement in America, a campaign to rescue the landscape, townscape, and civic life of our nation from the failed experiment of a drive-in utopia. Few public intellectuals in any field use the English language to more powerful effect than Krier, a Luxembourgois who lived in London for 20 years and now makes his home in southern France. He brings an exhilarating clarity to issues of place-making and architecture that have been otherwise subject to a remorseless obscurantism by a colorful cast of self-promoting avant-gardist charlatans ranging from Le Corbusier in the 1920s to Peter Eisenman in our time.



In this comprehensive book, lavishly illustrated with the author's drawings and lucid, witty diagrams, Krier lays out his case and issues a challenge: The twentieth-century movement called Modernism, and its cultish offshoots, have failed to produce buildings and cities worth caring about, or even capable of supporting the continued enterprise of civilization, and it is time to replace them with something better, namely, traditional principles and methods of building consistent with the real needs of the human spirit. Much of the knowledge necessary to achieve this restoration of civilization's dwelling place already exists in the very history from which Modernism sought to divorce itself.

Krier is particularly adept at presenting the meaning of the city as both a technical matter and a moral imperative: "All traditional architecture clearly distinguishes between the public and/or

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sacred buildings, on the one hand, and the utilitarian and/or private buildings, on the other. The former expresses the qualities of institutions—dignity, solemnity, grandeur for the *res publica* and the *res sacra*; the latter, the more modest private activities of housing, commerce and industry in the *res privata* and the *res economica*...if museums look like factories and churches like industrial warehouses, a basic value of the state is in crisis."

Modernist dogma has promoted a confusion of building types that has made it impossible for cities to function meaningfully: "The sterility of this so-called innovative ideology...is clearly revealed in the confusion of its terminology. A garden city is not a true city and not a true garden—a curtain wall is not a wall and not a curtain—a multi-purpose hall is no real substitute for a church, a theater, or a sportshall. The same is true of a business park, a reception area, a machine for living, a satellite city, green belts, open spaces, etc.—This 'anti-glossary,' the instrument and expression of a so-called 'abstract reality,' is proof that concrete urban reality is the product of a civilizing vision and not the automatic result of mere building zeal. An industry that produces non-places, unreal reality, abstract objects can only be a transitory phenomenon."

Krier's criticism of the contemporary non-place or anti-city begins with the catastrophe of zoning—the systematic disassembly of the complex civic organism into less than the sum of its parts. Zoning may have started as a reasonable response to the novelty of industrialism, but it has evolved into an abstract government scheme that fragments daily life and makes car-dependency mandatory. Under the bonehead logic of zoning, benign activities like shopping are given the same treatment as glue factories, and detached from the places where people live, with the result that we have become a United Parking Lot of America.

To his credit, Krier recognizes that a critique of this mess is futile without a workable counter-vision, and he presents a rich one, beginning with graphical master plans for the restoration of several European city centers, a very impressive design for the "completion" of Washington, D.C., moving finally to the actual project of Poundbury, which has been under construction for a few years now and is partly inhabited.

Compared to the other putative leading figures in international architecture, Krier's work is the most comprehensive and intelligent. Least of all does he seek to shock with ersatz novelty or dazzle with fake innovative genius. The lexicon of urbanism already exists in 50 centuries of human culture. We need to reacquaint ourselves with it. The invention of the city, Krier has written elsewhere, "was a spiritual and technical achievement the historical significance of which surpassed by far the discovery of fire or the invention of the wheel." We need to reconnect our future with the past in order to live in a hopeful present. The city and the town are indispensable, and they must be places worthy of our spirits. Without them, we are not likely to remain civilized.

James Howard Kunstler is the author, most recently, of Home From Nowhere.

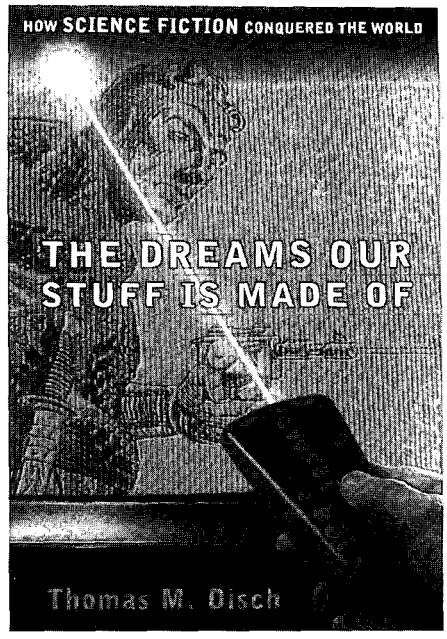
ROCKET MEN

By Brian Doherty

The Dreams Our Stuff Is Made of: How Science Fiction Conquered the World
By Thomas M. Disch
The Free Press, 256 pages, $25

Science fiction writer and poet Thomas M. Disch begins his book on the cultural impact of science fiction by nominating the genre as America's national literature. But his reasons reflect well on neither America nor science fiction. This, the often cynical and self-hating science fiction author avers, is because "America is a nation of liars," and science fiction is "the art form best adapted to telling the lie we like to hear and to pretend we believe."

Is it as bad as all that? Disch has been part of the science fiction world since the early '60s. Yet he seems desperate not to be associated with many of his science fiction brethren, for whom his distaste positively drips onto the pages—often for political rather than literary reasons.



He sees and decries nutty fanaticism in Philip K. Dick, right-wing militarism in Robert Heinlein and Jerry Pournelle, cloying P.C. feminism in Ursula Le Guin.

In discussing Le Guin, Disch lets slip some delicious gossipy insight into how canons get made. Le Guin—largely, Disch suggests, because of her bludgeoning feminism—is the literary establishment's pet science fiction writer; so to her was tossed the laurel of co-editing *The Norton Book of Science Fiction*. Le Guin approached Disch about anthologizing a story of his that Disch considered a trifle, but one with an ideological message of which Le Guin approved. Disch refused use of that piece in strenuous terms, opining that he'd rather be remembered by posterity for his granny's lemon pudding recipe than that piece of didactic fiction. Thus, Disch remains unensconced in the healing arms of Norton, and he thinks many of his fellow science fiction writers ill-served by Le Guin's choices.

In a footnote, Disch supplies his readers with that pudding recipe. I've tried it three times, and it is indeed something history ought not to forget. That's the sort of book this is: by turns cheeky, mean, funny, gossipy, and tasty indeed.

Disch is a science fiction insider, yet at times he is as unfair to the genre as the crustiest *littérateur*. He sums up science fiction as in general a trashy literature for

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resentful arrested adolescents. His own culpability is admitted, but not really addressed. Disch doesn't analyze how or why his own novels fit into his thesis about science fiction. If he had done so, the book would have supplied useful insight into what he meant to accomplish with his own labors.

There is something about science fiction—a subtly addictive quality that fan Kingsley Amis wrote about in his book on the genre—that makes outsiders misunderstand it, even recoil from it. Science fiction has certainly achieved powerful cultural resonance. Disch's book at its sturdiest makes a good case for this resonance—ranging from the atom bomb to Scientology to UFO-abductee mania to space-based defense systems to American pop culture's most lucrative movies. But science fiction is still a disrespected sad sack as far as those who care about "real" literature are concerned. When some science fiction achieves classic status, like Orwell's *1984*, it is assumed that if it is good, it isn't really science fiction.

This is a shame because, truth be told, so much of it is just *great* in a very American way—bold, visionary, brash, unstuffy, expansive, exciting—youthful in the best sense, in the sense that America still behaves like a young country, not a decadent empire. The accomplishments and visions of, for example, the computer and aerospace industries are science fiction visions. At their worst, they can be tools of big government and militarism; at their best, they represent new vistas of power, speed, and ability for everyone. They are also the keys to a particularly American cultural "fantasy": The notion that tomorrow can be better than today.

One would think that as a science fiction man himself, Disch might agree, if even a little, with notions of science fictional greatness. Instead, he takes an iconoclastic delight in smacking around giants like Robert Heinlein, whom he condemns as madly militarist/racist/fascist/sexist, and Ray Bradbury, whom he wickedly writes off as "a lifelong child impersonator of a stature equal to that of Pee Wee Herman."

Disch calls Edgar Allan Poe the father of science fiction, but again for uncomplimentary reasons. After re-telling Poe's story "Mesmeric Revelation," Disch writes, "There, in that marvelous conflation of wish fulfillment, pop theology, and pseudoscientific persiflage is all science fiction in a nutshell—and...the better part (and the worst) of the American Pop Culture to come."

For all that, Disch shows a head-shaking admiration for the form. The science fiction he presents is like America, its home, in many respects: fabulous, eccentric, subsuming varied beliefs and tendencies in an uneasy but living equilibrium—militaristic and spiritual, lecturing and freewheeling—and a place where heterodox opinions can be expressed with relative impunity. I won't go so far as to say that to love one is to love the other. But they share similar virtues.

Brian Doherty is assistant editor of Reason.

CHECK OUT THAT MAINFRAME!

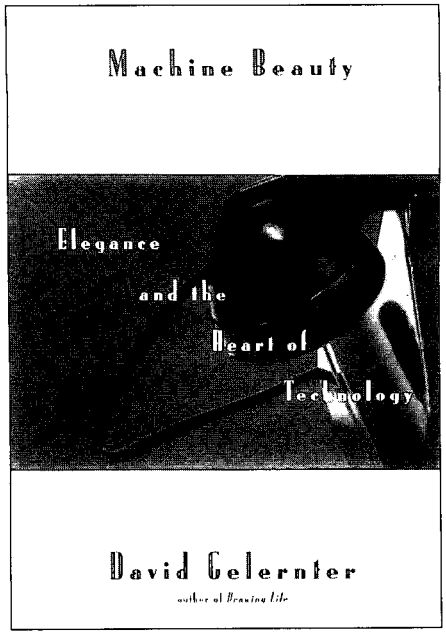
By Eli Lehrer

Machine Beauty: Elegance and the Heart of Technology
By David H. Gelernter
Basic Books, 166 pages, $21

In his spottily argued but nonetheless intriguing book *Machine Beauty: Elegance and the Heart of Technology*, Yale computer scientist David Gelernter argues that a never-ending quest for beauty drives technological innovation.

Beauty, as Gelernter defines it, consists of "a happy marriage of simplicity and power—power meaning the ability to accomplish a wide range of tasks." Gelernter argues that nearly all really significant technological advances, from the classic telephone design (which serves as his cover photo) to the Hoover Dam, were driven by a quest to create objects that represent "the pure embodiment of science and engineering."

He believes, however, that machine beauty scares some people and seems contrary to the purpose of engineering. "Insisting that beauty is at the heart of science and technology is like ordering wine at lunch," he writes. "It takes a



serious proposition and makes it frilly and frivolous."

From here, Gelernter launches into a discussion of Apple Computer's Macintosh system as a means of illustrating this paradox. He believes, correctly, that the Macintosh system was elegant and beautiful, while its competitors in the Windows/DOS world weren't. Using carefully selected quotations from computer industry sources, he tries to prove that the Macintosh system itself (although not its design philosophy) lost out in the market because the idea of machine beauty scares people. Although he may have a point, his acknowledgment of other reasons for the Macintosh's failure seems incomplete: he addresses its lack of mechanical reliability with only a passing anecdote and barely mentions the significant criticisms which were (fairly) leveled against the underpowered and inflexible early Macs.

To illustrate working technological beauty, Gelernter discusses his own Lifestreams project, a commercial effort to develop a software "super-diary" that would contain nearly every piece of paper a person generates and make it accessible from any Internet-linked computer. The technology seems enormously appealing, and Gelernter's explanation of it is lucid and intriguing. Yet one can't but wonder if Gelernter's discussion may be a bit self-serving: He never presents any

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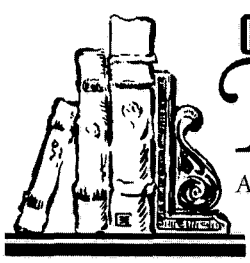

off The Shelf

A REGULAR REVIEW OF CLASSIC, OVER-LOOKED, NEWLY RELEVANT, OR OTHERWISE DESERVING OLDER BOOKS

THIS PERFECT HELL

By Ralph Raico

This Perfect Day
By Ira Levin, 1970

Ira Levin's gift is no longer what it once was, to judge from his recent *Son of Rosemary* and his *Sliver* a few years back. Still, we are permanently in Levin's debt. For decades he produced some of the most exciting and intelligent page-turners in the business—*A Kiss Before Dying, Rosemary's Baby, The Stepford Wives*, and *The Boys from Brazil*. Like his Broadway hit, *Death Trap*, these were all turned into movies. *Rosemary's Baby*, brilliantly directed by Roman Polanski with a superb cast, was understandably omitted from the American Film Institute's recent list of the 100 greatest American films—otherwise, there might not have been room for *Jaws* or *Dances with Wolves*. However, the best work of Levin's creative period was never filmed at all. It is *This Perfect Day*.

This Perfect Day belongs to the genre of "dystopian" or anti-utopian novels, like Huxley's *Brave New World* and Orwell's *1984*. Yet it is more satisfying than either. Not only is its futuristic technology more plausible (computers, of course), but the extrapolation of the dominant ideology of the end of the twentieth century is entirely convincing. And from the children's rhyme at the beginning:

> Christ, Marx, Wood, and Wei
> Led us to this perfect day....

to the thrilling denouement some 300 pages later, the novel is practically the ideal-type of a good read.

The action begins in the year 141 of the Unification, the establishment of global government, which finally led to consolidating all the world's supercomputers into one colossal apparatus lodged deep below the Swiss Alps. UniComp classifies and tracks all the "members" (of the human Family), decides on their work, residence, and consumption goods, whether they will marry and if so whether they will reproduce, and everything else.

Egalitarianism and altruism are all-pervasive. "Losing's the same as winning" is one of the catch-phrases drilled into kids. "Hate" and "fight" are the dirty words—only a very sick member would utter such a shocker as, "Fight you, brother-hater!" Genetics has progressed to the point where skin color (tan), body shape (unisex), and facial features (brown slanted eyes) can mostly be programmed. Scientists are busily at work rooting out the biological basis of aggressiveness and egotism and implanting docility and loving kindness in their stead. The aim is to have this compassionate race expand across the universe, and space exploration is another of the Family's unifying collective goals.

While awaiting the final solution to the individualist problem, Uni subjects every member to monthly "treatments." The injections include vaccines, contraceptives, tranquilizers as prescribed, and a medication that reduces aggressiveness and limits the sex drive to a lackadaisical once-a-week encounter. All of this is mediated by super-caring psychotherapists, who constantly monitor the members' mental health.

Enter Chip—official name Li RM35M4419—the hero, not just "protagonist," of this novel. From the start two things distinguish Chip. First, one of his eyes is green, genetic science not yet being foolproof. Second, he has a grandfather, Papa Jan, a throwback to pre-U times, who bestowed the nickname "Chip" on the lad after his own granddad, a fearless cosmonaut. Papa Jan perplexes Chip: Often he says things in such a way that he seems to mean the opposite of his words. On a family trip to the world's greatest tourist attraction, Papa Jan—who worked on the construction of UniComp—shows Chip the real Uni, not the pastel proxies on inspiring display.

As he grows up, Chip keeps having heretical thoughts. Something about the uniformity of design in apartments and public buildings is vaguely disturbing. Even the pictures on the wall go against the grain—always one of a handful that includes *Christ Expelling the Money Changers, Marx Writing*, and *Wei Addressing the Chemotherapists*. But the monthly treatments quickly submerge such troubling ideas.

Chip is discovered by a small group of dissidents, misfits like himself who have found a way to minimize the effects of the treatments. They meet in secret, spending their time cursing Uni, pairing off for "untreated" sex, and most depraved of all, smoking tobacco. To persuade Chip to trick Uni into giving him reduced treatments, they introduce him to the concept of "consent": "Your body is yours, not Uni's." But Chip has had the Family's philosophy drummed into him—there are no ethical or political conflicts, only medical problems, questions of mental health or illness. He argues with himself: "As if consent had anything to do with a treatment given to preserve one's health and well-being, an integral part of the health and well-being of the entire Family!" Uni, after all, has provided everything he's ever had, his food, his clothes, his education; it even granted permission for his conception. Try to trick Uni? Just how sick is he?

This is as much of the splendidly inventive plot as can decently be divulged. It's not really giving anything away to say that Chip will somehow withdraw himself from the Family, and that, in the end, he will keep his destined date with the real UniComp.

Ira Levin's great book cries out to be filmed. Yet who in Hollywood could be trusted to direct *This Perfect Day* in the spirit in which it was written? The name Mel Gibson comes to mind.

Ralph Raico teaches history at the SUNY *College at Buffalo. His* Classical Liberalism: Historical Essays in Political Economy *is forthcoming from Routledge.*

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of the potential problems with his design ideas except to say they may exist.

Ever the polymath, Gelernter moves forward to discuss the artistic design of computers. His objective is not so much to proselytize in favor of his own designs as to open people's eyes to the possibility that computers might be better designed as physical objects. Even in this chapter, however, the book might have benefited from some discussion of physical computer designs—like the tenth-anniversary Macintosh and Compaq Armada 4100 series laptops—which appear to realize Gelertner's vision of elegant and different computer designs.

Gelernter's conclusion is at once fascinating and frustrating. While admitting that he doesn't expect his ideas to be realized, he proposes teaching computer science as an art—forcing students to write elegant programs in a studio setting and coupling their training with intensive study of fine arts. He also proposes this as part of a radical rethinking of all higher education and quickly segues into a passionate (if unoriginal) attack on television as a great social evil. The section is interesting but undeveloped. Gelernter presents his ideas in just enough detail to not be threadbare but not enough to satisfy the reader. The very end of his book, a more-or-less free-standing essay on the beauty of a 1930s radio, does, however, neatly unify many of the book's elements.

As in all of his books, Gelernter is intensely personal and idiosyncratic. At one point, he tells readers that sea green is "the greatest crayon color ever invented." Should we care? The book contains a lot of good ideas and, as always, Gelernter proves himself a fine prose stylist. Still, there isn't really enough information or argument to carry this excursion as a book: It probably could have been great as a long essay in a literary magazine.

Eli Lehrer is a staff reporter for Insight magazine.

KOTKIN continued from page 26

Wiesenthal Center, rather than on the fate of the region.

Affinities that are likely to be stronger, and ultimately more reliable, can be found in other sections of L.A.'s information economy, including theme park design and multimedia. Regional trade organizations such as the Themed Entertainment Industry Association, and Lawnmower, a 500-company multimedia networking group, have begun to flourish. As in other parts of the emerging economy, members of these groups tend to come from small, even tiny organizations. "In an industry like this one, you have to create a community before you can build a career, a product, or a company," explains Lawnmower founder Jim Jonassen.

Spurred by the economic crisis of the early 1990s, more conventional industries have also established sector-based organizations, ranging from the Toy Industry Association of Southern California to the Food Industry Business Roundtable. They have become increasingly involved not only in "networking" but in lobbying political leaders and establishing a higher public profile for their industries.

In some cases, they tackle problems common to their industries; this June the California Fashion Association announced plans to begin offering health insurance to garment workers employed by their member companies. "We are pointed at as a sweatshop industry, an industry that doesn't care about its workers," observes the Association's Ilse Metchek. "This is the most effective, immediate thing we can do—making health care affordable and available for every worker in the garment industry."

Workforce development is another activity of these industry networks. The Industrial Leadership Council, for example, an association of small manufacturers, has set up training programs for machinists. Several animation firms, including Disney, Sony, and Dreamworks, have sponsored programs in animation and other entertainment-related trades at local schools.

At the same time, the burgeoning minority population—during the 1990s the L.A. region has led the nation in Asian and Latino growth—points to the rising importance of another kind of network, one based on ethnic affinities. Each ethnic group has its own set of challenges relating to governmental contracting, discrimination, immigration laws, educational commitments, or other matters. In some places, such as Chinatown, East Los Angeles, Westminister, and Santa Ana, minority business organizations constitute an increasingly critical element in the emerging economic leadership. Although few minority entrepreneurs feel openly excluded, many believe that mainstream business organizations like the L.A. Chamber of Commerce have been slow to recognize the increasing role of minorities, and women, in the region's new economy. "What you have are thousands of Guatemalans, Salvadorans, and Koreans with small businesses," says Wes Ru, who has started several manufacturing firms in the tough Pico Union neighborhood west of downtown L.A. This economic reality is different from the past, Ru says, "but it's the basis of something very vibrant."

These disparate ethnic, industrial, and sub-regional groups represent the true dynamism of business leadership in the huge diverse metropolitan regions of America. As these linkages grow over time, they could provide the basis for a new kind of concert of economic interests. Functioning as an informal "network of networks," this new model would function in an ad hoc manner, with groups working together when necessary, separately when appropriate. It is not a model that will thrill those who seek a return to a more homogeneous or politically "balanced" kind of leadership. But it could prove essential to what Toynbee defined as the true mission of successful elites—to help their communities, cities, and regions meet the challenges of a new era.

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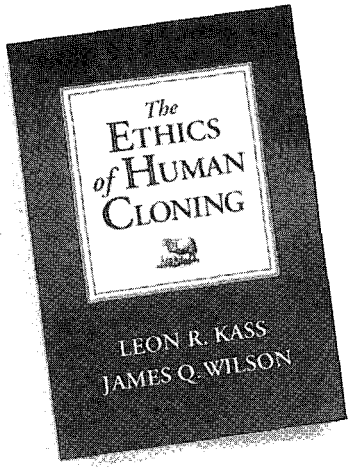

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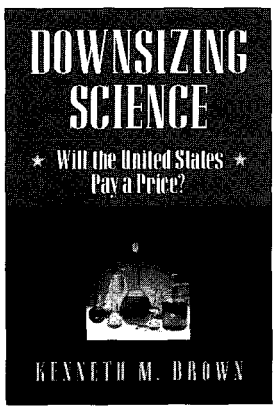

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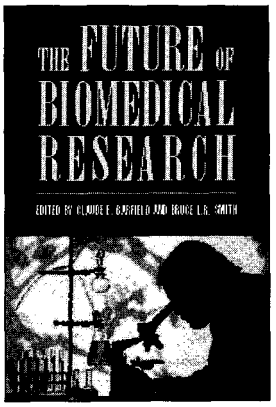

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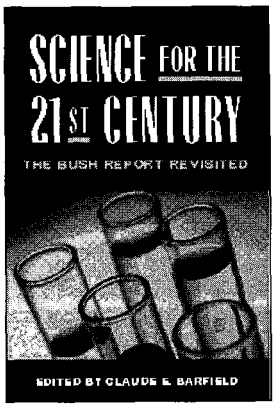

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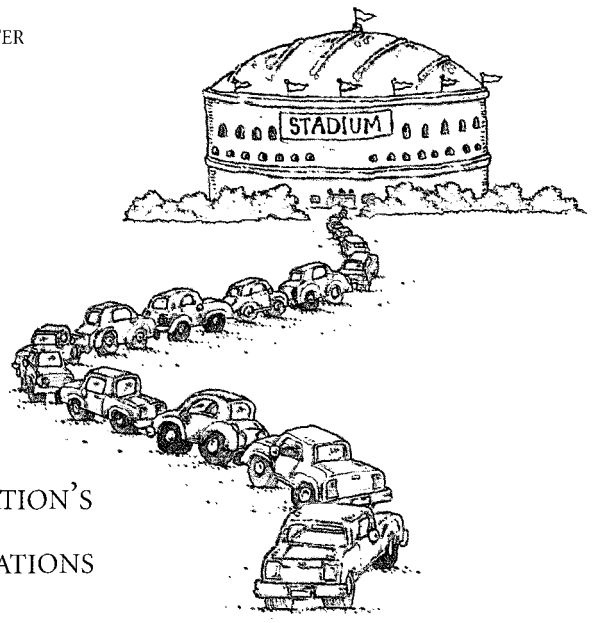

SUMMARIES OF IMPORTANT NEW RESEARCH FROM THE NATION'S UNIVERSITIES, THINK TANKS, AND INVESTIGATIVE PUBLICATIONS

POLITICS

The Court of Last Resort

Lee A. Casey and David B. Rivkin, Jr., "Against an International Criminal Court," in Commentary *(May 1998), 165 East 56th Street, New York, New York 10022.*

A team of international diplomats recently signed a treaty that would establish an International Criminal Court (ICC) to prosecute international war criminals. Lawyers Lee Casey and David Rivkin call on the Senate to reject the treaty.

It's not clear whether an international court would have any say over infractions committed by Americans on U.S. soil. The Supreme Court has repeatedly ruled that foreign courts are not established under the provisions of Article III of the Constitution and therefore have no jurisdiction over domestic matters. It is also unclear whether the ICC would afford Americans the protections the Bill of Rights provide citizens in our legal system, including rights to due process and a speedy trial, and safeguards against unreasonable searches and seizures.

History has shown international organizations are prone to politicization. If the United States unilaterally decided to obliterate Iraq's presidential palaces, three of the five permanent members of the Security Council (France, China, and Russia) would likely protest. Casey and Rivkin argue that under the ICC's rules, the court could indict *anyone* involved in an unlawful act that caused a civilian casualty, from the U.S. President on down. If an American were charged, he would be required to surrender to the court until the case ended. Yet international organizations already have the means to bring war criminals to justice. The Security Council recently convened tribunals investigating war crimes in Rwanda and Yugoslavia, but these tribunals, unlike the proposed ICC, are limited in time and scope. The ICC "will undermine our own system of justice," Casey and Rivkin conclude.

ECONOMICS AND BUSINESS

The Business of Sports

John Andrews, "The World of Sport: Not Just a Game," in The Economist *(June 6, 1998), 25 St. James Street, London SW1A 1HG, England.*

The amateur era in sport lasted a surprisingly long time. Until 1962, for example, English cricketers were divided into upper-crust "gentlemen" who played for free and lower-class players who were reluctantly given salaries. Tennis remained an amateur sport until 1968. Even when players began winning endorsement contracts, the stakes were relatively small. Golfer Arnold Palmer, for example, endorsed Heinz ketchup in 1959 for $500 and all the ketchup he wanted.

Today professional sports is a huge business. According to *Forbes*, the world's highest-paid athlete, Michael Jordan, earned a total of $78 million in 1997—$31 million in salary and $47 million in endorsements. Even Arnold Palmer, long retired, earned $16 million from endorsing various products. John Andrews of *The Economist* believes professional sports will continue to expand.

The wealthiest athletes all have either American roots or large American audiences. Of the ten richest athletes in the world, nine are Americans: Michael Jordan, Shaquille O'Neal, and Grant Hill in basketball; boxers Evander Holyfield, Mike Tyson, and Oscar De La Hoya; golfer Tiger Woods; auto racer Dale Earnhardt; and hockey player Joe Sakic. Athletes in non-American sports, by comparison, earn relatively modest salaries.

Television and corporations ensure athletes are richly compensated. In 1948, the BBC paid 1,000 pounds ($30,000 in today's dollars) to broadcast the Summer Olympics. In 1996, the world's broadcasters paid $895 million to air the Summer Olympics, while fees for the 2000 Summer Olympics have escalated to $1.3 billion. The European Broadcasting Union estimates that it will pay 77 times more for the 2008 Summer Olympics than it did for the 1980 games.

Andrews believes technological advancements will ensure the continued growth of sports. Digital systems currently in development will enable television networks to air as many as six times the channels they now provide and many of those new channels will cover athletic events. Pay television could enable viewers to pick the car they follow in an auto race, or choose from which end of the court they view a tennis match. "The

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accessible and dazzling tricks offered by new technologies," Andrews writes, "will make sport more alluring than ever."

Reform Unemployment Insurance

George C. Leef, "Unemployment Compensation: The Case for a Free Market Alternative," in Regulation *(Winter 1998), Cato Institute, 1000 Massachusetts Avenue N.W., Washington, D.C. 20001.*

The Social Security Act of 1935 also created a federal system of unemployment insurance. Now that reform of Social Security's pension provisions is being considered, George Leef suggests it's time to reform federal unemployment insurance, too, by replacing it with a privatized program similar to an Individual Retirement Account (IRA).

Currently, unemployment insurance is paid for by federal and state taxes. The federal government takes 0.8 percent of an employee's wages (up to $7,000). States also impose their own taxes, up to 10 percent of wages. In 1996, the federal government collected over $6 billion in unemployment taxes, while the states collected over $21 billion.

Although all employees' wages are taxed to pay for the unemployed, a majority of those unemployed are not eligible for unemployment benefits for various reasons. In Michigan, for example, workers have to be employed for at least 20 weeks before they can collect. In 1991, during the last recession, only 42 percent of the unemployed nationwide received benefits in an average month.

Another defect in the system involves companies that hire seasonal labor—such as construction firms, department stores, and resorts—who employ workers for half a year and then let them collect government payments in the off-season. More responsible firms that don't lay off workers are punished by being forced to pay into the unemployment system, even though their workers receive nothing in return.

A fairer arrangement, Leef argues, would be for firms to withhold a certain percentage of wages for unemployment taxes and deposit those amounts into an Individual Unemployment Account (IUA) for each worker. Like an IRA, an IUA would be controlled by workers and would be portable. Lees believes that if workers had to use their own savings rather than government benefits during periods of unemployment, they "would have a stronger incentive to explore alternatives to layoffs with employers facing difficult times."

SOCIETY

To Be American

John J. Miller, The Unmaking of Americans: How Multiculturalism Has Undermined America's Assimilation Ethic. *Free Press, 1230 Avenue of the Americas, New York, New York 10020.*

In his memoirs, President Reagan noted that our country is consistently able to turn immigrants into patriotic Americans. "An immigrant can live in France," he wrote, "and not become a Frenchman; he can live in Germany but not become a German…but anyone from any part of the world can come to America and become an American."

But today the process of assimilation is not as smooth as it should be, observes John Miller, a reporter for *National Review.* Government agencies such as the Immigration and Naturalization Service (INS), the U.S. Department of Education, and the Equal Employment Opportunity Commission (EEOC) often stand in the way of immigrants' efforts to become productive citizens.

Most immigrants come to America to work hard. According to the Urban Institute, 89 percent of working-age immigrant males are in the labor force, a figure slightly above the 87 percent of native-born males in the same age bracket. Immigrants also become more productive the longer they stay in America. According to the 1990 Census, immigrants who came to the U.S. after 1985 earned an average of $19,966 (compared to the national average of $32,057) while immigrants who arrived between 1960-64 earned $35,945. Those who arrived in the 1950s made, on average, $38,333.

But certain regulations hinder immigrant advancement. For instance, most immigrants realize they need to learn English to get ahead, yet the EEOC's 22 pages of rules governing when English can and cannot be required strongly discourage employers from insisting English be spoken at work.

Worse, highly skilled immigrants have a difficult time coming to America. If an employer wants to hire foreign help, he must receive permission from the U.S. Department of Labor. Then he must receive approval from the INS and prove that the prospective employee has unique credentials his other workers lack. This red tape makes hiring well-educated foreign workers very expensive. Computer chip-maker Intel estimates that it spends between $8,000 to $10,000 to hire an immigrant.

Bilingual education is another government obstacle to assimilation. For the past 20 years, the Department of Education has annually spent millions on programs encouraging that classes be taught in immigrants' native languages. Yet no evidence exists that this helps an immigrant learn English. A 1997 study by the National Research Council, for example, found that teaching in a language other than English "has no long-term benefits" for immigrants. In Connecticut's bilingual classes, only 6 percent of 11,000 students in the 1993-94 school year learned enough English to be graduated.

Miller also contends the federal government's naturalization programs could be better. Currently, immigrants must answer correctly only seven of 12 questions in American history and government. In addition, the INS's backlog of paperwork—it's behind on over 1 million naturalization forms—means it takes an immigrant over a year to obtain a simple 15-minute interview with an INS officer.

But Miller observes that the INS bureau in Seattle has discovered a way to boost efficiency. It contracts with community colleges and churches to teach immigrants the necessary American history and government. These 20- to 30-hour courses provide "the immigration service with candidates whose credentials are in perfect order," says Miller.

Other ways the federal government can help immigrants assimilate, Miller argues, include eliminating welfare payments for non-citizens, ensuring ballots and other voting materials are only in English, and requiring that illegal immi-

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grants and other non-citizens not be counted when determining congressional apportionment.

Lumps in the Melting Pot

William H. Frey, "The Diversity Myth," in American Demographics *(June 1998), P. O. Box 68, Ithaca, New York 14851.*

Immigration foes often contend the United States is becoming a "majority minority" nation in which whites will be submerged beneath a tidal wave of Asians, Hispanics, and blacks. William Frey, a demographer at the University of Michigan, believes the truth is more complex. While America's larger cities are becoming more ethnically diverse, whites remain the majority throughout most of America.

The Northeast, Midwest, Rocky Mountains, and Northwest are mostly white. In the 3,142 U.S. counties, over half were 90 percent white as of 1996. There are only 226 counties where whites are in the minority, mainly in the Southwest where Hispanics live and in rural Southern counties where African Americans outnumber everyone else.

Many Hispanics are moving to metropolitan areas, most notably Miami, New York City, and Chicago. Many Asians have moved to Los Angeles and San Francisco. Both blacks and whites are moving to the Sunbelt. Blacks tend to move to such southern cities as Atlanta, Dallas-Fort Worth, Houston, Raleigh-Durham, and Charlotte. The black populations of northern cities like New York, Chicago, and Philadelphia are also rising, but Frey believes that these "large population gains...represent natural increase among already large black populations."

As of 1996, 95 percent of Asians, 91 percent of Hispanics, and 85 percent of blacks lived in metropolitan areas. Frey predicts that this is unlikely to change in the foreseeable future: "'Majority minority' areas will be few and far between."

Quotas and Beyond

Roger Clegg, "Beyond Quotas," in Policy Review *(May/June 1998), Heritage Foundation, 214 Massachusetts Avenue N.E., Washington, D.C. 20002.*

Affirmative action is in retreat, but although quotas and racial preferences have proved unpopular and unconstitutional, government should not end its efforts to help minorities and women, says Roger Clegg of the Center for Equal Opportunity. Instead, he believes, government should support "positive, race-neutral initiatives to create and publicize economic and educational opportunities for everyone willing and able to compete for them."

Colleges and universities have created many programs that help the poor without creating race or gender quotas. For example, the University of California abolished affirmative action in 1996, but some U.C. campuses now create partnerships with disadvantaged public schools to provide training, mentors, and college preparatory classes. The Berkeley campus has sent students to 40 schools near the university to run summer programs and tutors.

Cities and states can similarly adapt their contracting programs to be race-neutral. Between 1980-92, New York City had a "locally based enterprise" program that awarded 10 percent of city construction contracts to small, local firms, many run by minorities. The city awarded $575 million in contracts under this program until it was replaced by a race-based program. Associated General Contractors has a program in Portland, Oregon, and Kansas City known as the "Stempel plan" in which smaller firms team up with larger contractors to learn how to acquire contracts, obtain bonds, and satisfy other government requirements.

It's important, Clegg writes, not to create a disguised race-based program. For instance, after an affirmative-action program at the University of Texas was declared illegal by the courts, the state legislature passed a bill requiring the university to admit the top 10 percent of every Texas high school, including inner-city schools where even the best students had very low test scores. Similarly, California legislators are debating a proposal to reduce the role of SAT scores in college admissions on the grounds that using standardized tests hurts blacks and Hispanics. Both proposals, Clegg argues, "are neutral on their face" but designed to bias results in favor of minorities, regardless of whether they are qualified.

"Conservatives must focus" on increasing opportunity, Clegg concludes, "not on mandating proportional representation, not on eclipsing opportunities for some in order to redistribute goodies to others."

Education Schools Don't Educate

Heather Mac Donald, "Why Johnny's Teacher Can't Teach," in City Journal *(Spring 1998), Manhattan Institute, 52 Vanderbilt Avenue, New York, New York 10017.*

"For over 80 years," writes Heather Mac Donald of the Manhattan Institute, "teacher education in America has been in the grip of an immutable dogma, responsible for endless educational nonsense," a dogma she calls Anything But Knowledge. It implies that schools should do everything but teach students reading, writing, and arithmetic.

Teacher education in America took a turn for the worse in the 1920s. Such noted professors of education as William Heard Kilpatrick and George S. Counts argued it was more important to teach "lifelong learning" than facts. Harold Rugg's influential *The Child-centered School* (1928), for example, argued it was more important for a child to direct his own education than be forced to learn whatever the teacher wanted.

By the 1950s the "progressive education" movement had entered its decadent phase, with some classes even instructing

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"how to put on nail polish and how to act on a date." Today's professors of education still advise their students to behave in the classroom in ways that Kilpatrick and Counts would have approved. "Like aging vestal virgins," Mac Donald writes, "today's schools lovingly guard the ancient flame of progressivism."

Progressive education is called many names. Some education professors say the purpose of going to school should be "community-building." Professor Linda Darling-Hammond calls for "learning-centered classrooms" that "feature student talk and collective action." Another current education school fad is "brainstorming," where teachers place ideas on the blackboard and students spontaneously talk about the idea. Under any name, Mac Donald contends, the goal of education schools is the same: to undermine the teacher's ability to command the classroom. "Teachers traditionally represent elitism, learning, authority—everything that progressivism scorns," she writes, "and so they must be relegated to the role of mere facilitators for the all-important group."

Teacher's unions are currently pressuring states to tighten hiring rules so that only graduates of education schools can teach. Given the terrible ideas drilled into would-be teachers by education professors, Mac Donald believes this drive to "professionalize" the classroom "will be a disaster for children."

OTHER COUNTRIES

No More Bail-outs

Charles W. Calomiris, "The IMF's Imprudent Role as Lender of Last Resort," in Cato Journal *(Winter 1998), Cato Institute, 1000 Massachusetts Avenue N.W., Washington, D.C. 20001.*

In recent years the International Monetary Fund (IMF) has gone beyond its original purpose of assisting developing countries and begun massive bail-outs of their economies. The sums lent by the IMF (and the U.S. Treasury) to the Mexicans between 1994-95 amounted to 16 percent of Mexico's gross domestic product (GDP). By comparison, U.S. bank failures during the Great Depression only amounted to 4 percent of America's GDP. Charles Calomiris of the American Enterprise Institute argues that IMF bail-outs end up redistributing wealth "away from taxpayers in emerging economies, and toward the wealthy political cronies who control their countries' industries and financial institutions."

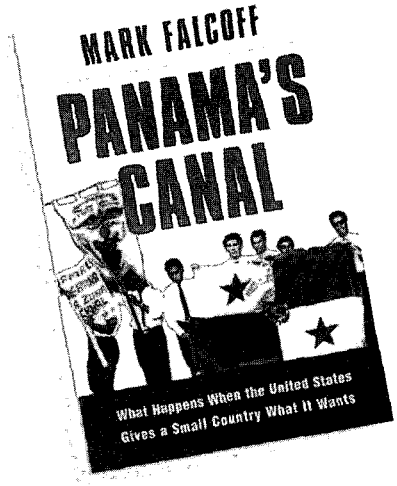
This occurs because the bailouts encourage Third World banks "to take on extreme risk." Their managers have learned they will be rewarded for failure with generous subsidies from international bankers. Because many of these loans come from banks in Europe and the United States, the IMF's subsidies also encourage bankers in the developed world to make loans for dubious ventures.

Calomiris believes Congress can do two things to restrain the IMF's bail-out program: They can refuse to provide any more U.S. funds for Third World loans and also abolish the Exchange Stabilization Fund, a New Deal program that chiefly serves as a way for the President to loan money to other countries. In the Mexican financial crisis of 1994-95, President Clinton used the Fund to loan Mexico $12 billion.

Market discipline will do more than government bail-outs to make Third World economies healthy, Calomiris concludes.

Sounding Taps in Panama

Mark Falcoff, Panama's Canal: What Happens When the United States Gives a Small Country What It Wants. *AEI Press, 1150 17th Street N.W., Washington, D.C. 20036.*



In 1977, President Carter and Panama strongman Omar Torrijos signed a treaty that gradually transferred control of the Panama Canal from the U.S. to Panama. In 1999, the final clauses go into effect, and American forces will complete their withdrawal. Mark Falcoff of the American Enterprise Institute reports that many Panamanians are quietly attempting to have some Americans stay.

The Panama Canal is not as economically important as it was in 1977. The Alaskan pipeline means oil can now be shipped by pipeline instead of tanker. The creation of double-decker railroad cars has dramatically reduced the costs of shipping goods between America's coasts. Supertankers are increasingly too big to fit through the canal locks. As a result, between 13,000 and 14,000 ships pass through the canal each year—numbers that haven't changed much since 1986.

As Panamanian control over the canal has steadily increased, maintenance has plummeted. The locomotives that pull ships through the canal locks frequently stall, causing substantial delays. Rubber guards that protect the locks have rotted away, increasing the number of dents in ships. Although Panama's president, Enrique Pérez Balladares, has called for spending as much as a quarter of the $419 million in canal tolls on maintenance, Falcoff fears that in the harsh Panamanian climate (as much as 200 inches of rainfall during the rainy season), such sums might not be enough.

Panama's record with those American facilities already turned over has been dismal. Thus far the U.S. has transferred 364,000 acres of land formerly in the Panama Canal Zone and 7,000 buildings. Squatters have swarmed into unoccupied land, causing substantial environmental damage to the canal's fragile ecosystem, and the Panama Railroad has turned into a weed-ridden ruin.

In 1996, Panama, hoping to avoid paying the $250,000 monthly fee to a U.S. contractor that maintains the bases, asked the United States to delay handing over Fort Davis and Fort Espinar. The U.S. refused. So far, Panama has had little

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success in replacing the bases with other enterprises or finding high-paying jobs to replace the money that will no longer be spent by the 10,000 departing U.S. troops.

With American retreat inevitable, Falcoff believes Panama's leaders have many challenges—maintaining an aging canal, creating new jobs, and above all learning "to live without the United States as a stopgap and scapegoat. These are tall orders, and we can only hope that for Panama's sake, it can meet them."

French Protectionism Fails

Tyler Cowen, "French Kiss-off," in Reason *(July 1998), 3415 South Sepulveda Boulevard #400, Los Angeles, California 90034.*

Around the world most filmgoers love American movies. About 80 percent of European box-office receipts come from American films, while European films account for only 5 percent of the money Americans spend on movies.

France has gone farther than most nations in trying to block the U.S. film industry, imposing an elaborate scheme of quotas, subsidies, and restrictions to favor home-grown film producers. Economist Tyler Cowen of George Mason University argues that such cultural protectionism has reduced the ability of French producers to compete in the global film market.

Before World War II, France had one of the freest film markets in the world. France did not develop a studio system, ensuring that hundreds of independent producers competed to create movies. The result: Such important directors as Jean Vigo, René Clair, and Jean Renoir flourished, and about 70 percent of movies watched by the French were home-grown, even though there were no restrictions on film imports.

Film bureaucracy in France arrived with the Nazis. In 1940, the puppet Vichy government set up an agency that loaned 65 percent of the cost of a film, assuming the script met with government approval. After the war, France kept the Vichy film agency intact, but changed its emphasis to discouraging distribution of foreign films. Directors began to battle a stifling bureaucracy. "I can't accept that someone wanting to make a film should have to submit requests to so many authorities," René Clair complained.

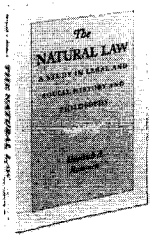
Matters have only worsened since. Today, France imposes a tax of 19 percent on movie tickets (on top of a value-added tax of 17 percent). Severe quotas are placed on VCR imports, making video rentals expensive. In addition, French cable channels are also used as a source of revenue. Canal Plus, the French counterpart to HBO, gives 18.5 percent of its pre-tax profits to the state, which then redistributes the funds to government-approved filmmakers.

All these subsidies have done little to inspire French filmmakers to make films people want to see. Much of the funds goes overseas, often in co-productions with American film companies. The films that are made, such as the recent productions of *La Reine Margot, Ridicule,* and *Beaumarchais the Scoundrel,* are "period costume dramas" that require a deep understanding of French history and politics to appreciate. Thus few foreigners see them.

The French government, Cowen argues, would do a better job of nurturing French films if they opened the French film market to rigorous international competition. "Film culture, like all culture, is dynamic," he writes. "It isn't protection that it needs; it is stimulation. Without it, the form atrophies."

Modern Editions of Classic Works for Readers Today

THE NATURAL LAW
A Study in Legal and Social History and Philosophy
By Heinrich A. Rommen
Introduction by Russell Hittinger



Originally published in German in 1936, *The Natural Law* is the first work to clarify the differences between traditional natural law as represented in the writings of Cicero, Aquinas, and Hooker and the revolutionary doctrines of natural rights espoused by Hobbes, Locke, and Rousseau. Beginning with the legacies of Greek and Roman life and thought, Rommen traces the natural law tradition to its displacement by legal positivism and concludes with what the author calls "the reappearance" of natural law thought in more recent times. In seven chapters each Rommen explores "The History of the Idea of Natural Law" and "The Philosophy and Content of the Natural Law." In his introduction, Russell Hittinger places Rommen's work in the context of contemporary debate on the relevance of natural law to philosophical inquiry and constitutional interpretation.

Heinrich Rommen (1897–1967) taught in Germany and England before concluding his distinguished scholarly career at Georgetown University.

Russell Hittinger is professor of philosophy and law at the University of Tulsa.

229 + xxii pages. Introduction, translator's preface, select bibliography, index.

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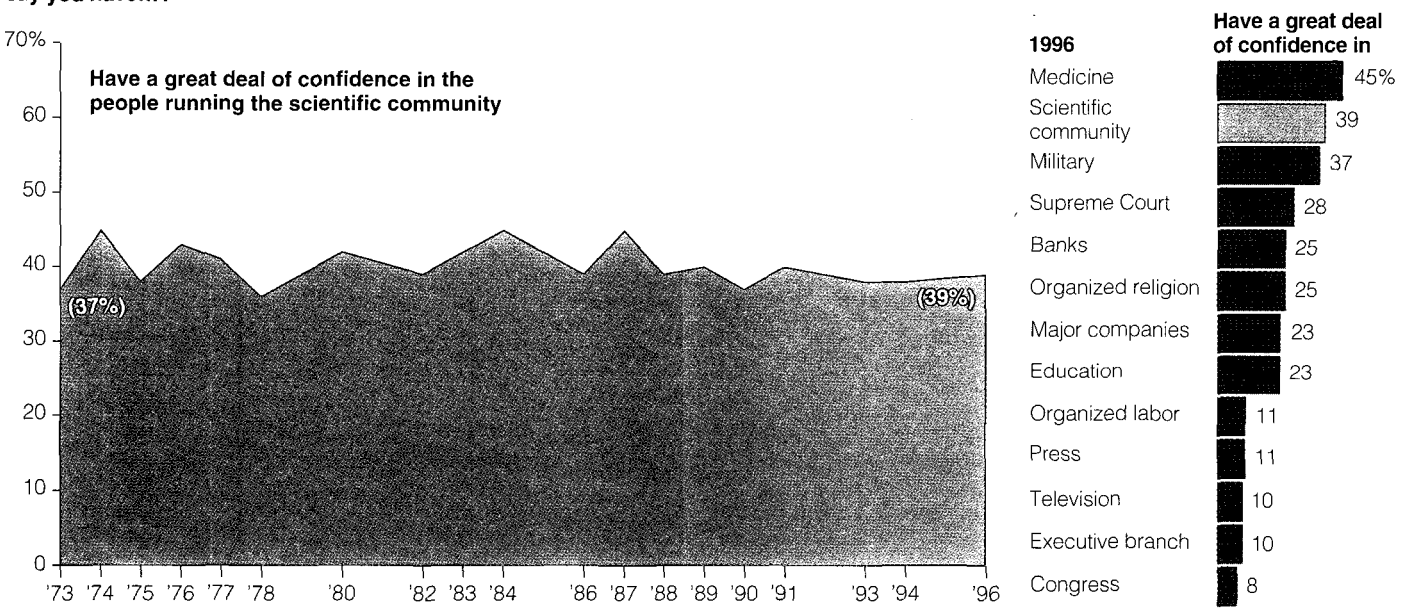
Opinion Pulse

EDITED BY KARLYN BOWMAN

FAITH IN SCIENCE

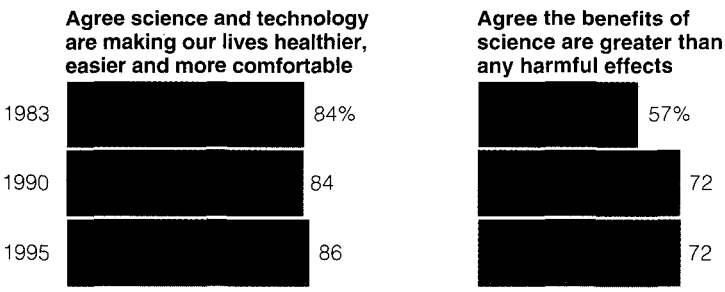
Although other institutions have suffered steep declines in esteem over the past 20 years, there has been little change in the proportion of those having a great deal of confidence in the people running the scientific community. Indeed, as the bar graph shows, those running science are more highly regarded than those in charge of most other institutions in American life. Solid majorities believe that the benefits of science are greater than any harmful effects and that the impact of new discoveries will be positive rather than negative.

Question: **I am going to name some institutions in this country. As far as the people running these institutions are concerned, would you say you have...?**



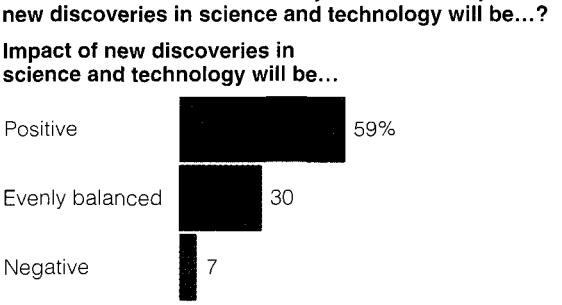
Source: Surveys by the National Opinion Research Center, latest that of 1996.

Question: **Now I want to read you some statements like those you might find in a newspaper or magazine article. For each statement, please tell me if you...?**



Note: Selected years shown.
Source: Surveys by J.D. Miller and L.K. Pifer published in *Public Attitudes Toward Science and Technology*, latest that of 1995.

Question: **New discoveries and inventions have both benefits and also risks and drawbacks. On balance, over the next few decades, do you think the impact of new discoveries in science and technology will be...?**



Source: Survey by the Roper Center for Public Opinion Research for the National Science & Technology Medals Foundation, May–June, 1996.

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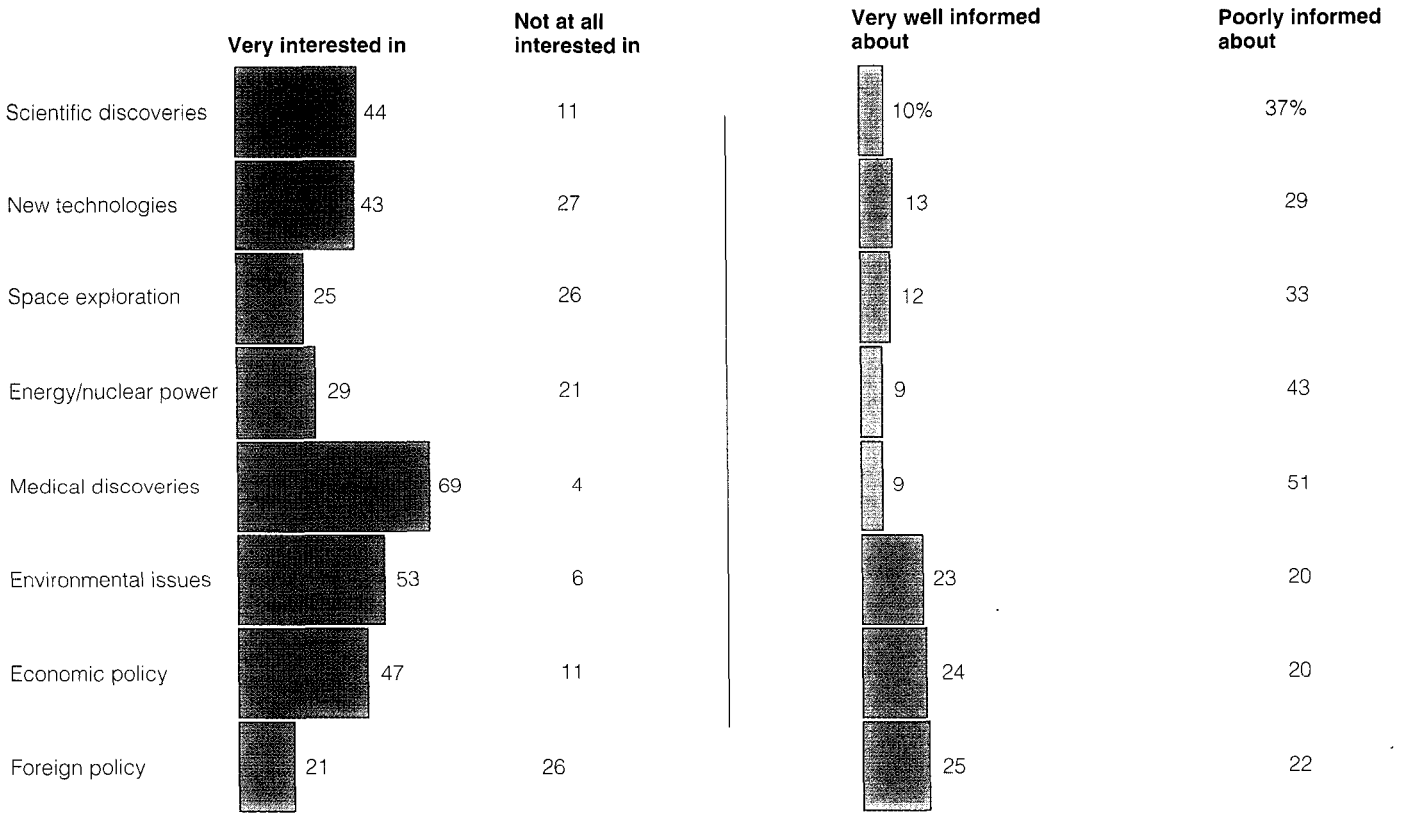
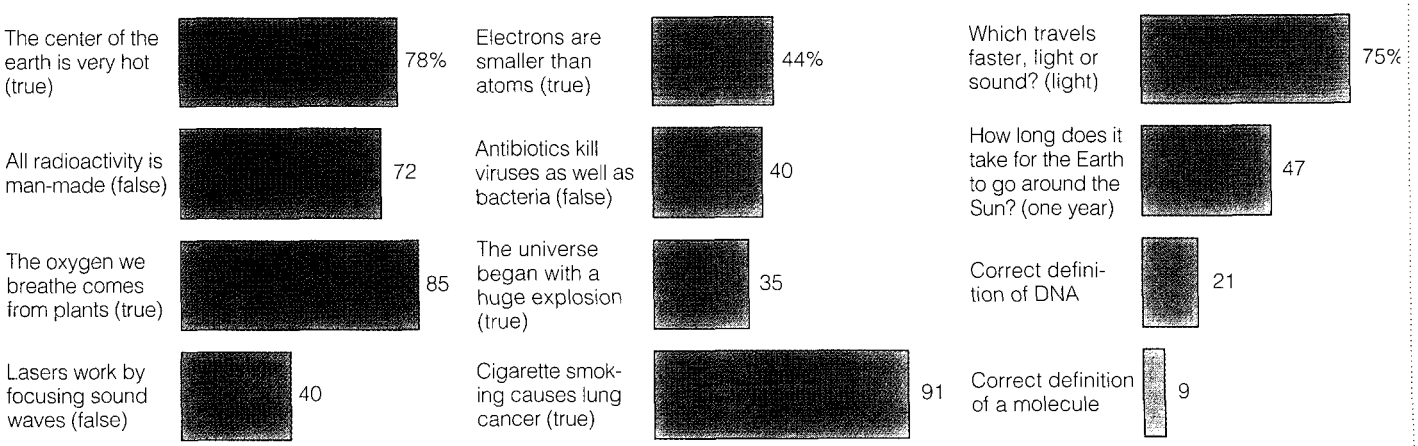
Much Interest, Less Knowledge

Americans are more interested than informed about science. News about medical discoveries, environmental issues, scientific discoveries, and new technologies interest us the most. Only small proportions say that they are very well informed about science issues in the news. The proportion giving the correct responses to questions about basic scientific concepts is shown below.

Question: **There are a lot of issues in the news, and it is hard to keep up with every area. I'm going to read you a short list of issues, and for each one—as I read it—I would like you to tell me if you are...?**



Percent of adult population giving correct responses



Source: Survey by J.D. Miller and L.K. Pifer published in *Public Attitudes Toward Science and Technology*, 1995.

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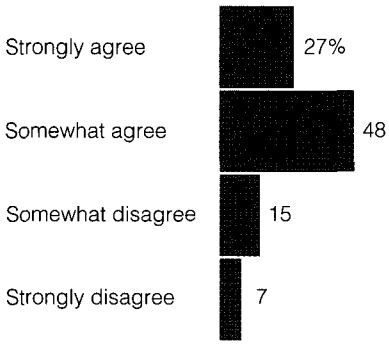
More Science, Please

Americans' commitment to U.S. leadership in science and technology is strong, as is the belief that pure scientific research is a good investment, even if the practical benefits can't be foreseen. Americans also believe that more emphasis is needed on science in the schools. Large majorities would like to see continued progress in many areas involving science and technology.

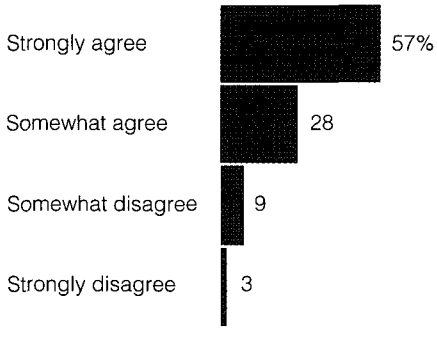
Question: **I'm going to read you a series of statements. For each please tell me if...**

It is important that the United States be the world leader in technological progress

Spending money on pure scientific research is a good investment even if it is impossible to see what practical benefits it might have

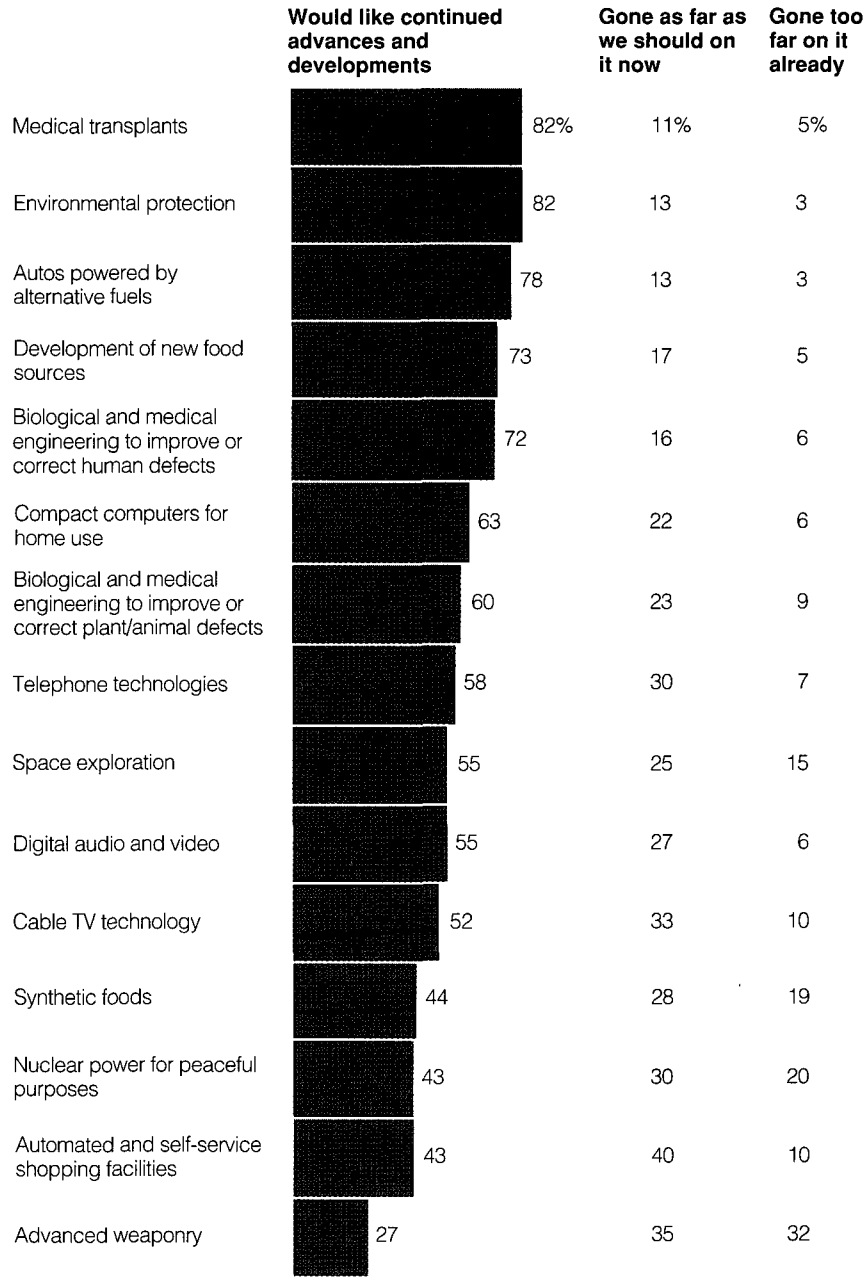


Unless we put more emphasis on science in the schools, we won't have the trained people we will need for life in the twenty-first century



Source: Survey by the Roper Center for Public Opinion Research for the National Science & Technology Medals Foundation, May–June 1996.

Question: **There are a number of things that have changed rather drastically over the past 20 years. Here is a list of some of them. Would you read down that list and for each one tell me whether you...?**



Source: Survey by Roper Starch Worldwide, January 11–25, 1997.

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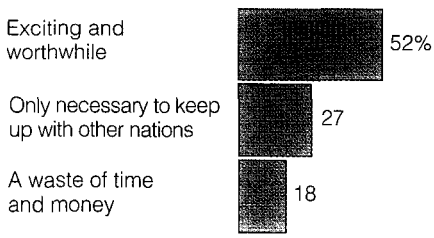
The Frontiers of Science

Most Americans believe that the space program has been worthwhile and that the benefits it has brought justify the costs. Americans are less certain about cloning, which offends the moral sensibilities of many. The proportion believing in UFOs hasn't changed much over the past 30 years. About 40 percent say they like science fiction. And nearly half of Americans have watched the TV show "The X-Files."

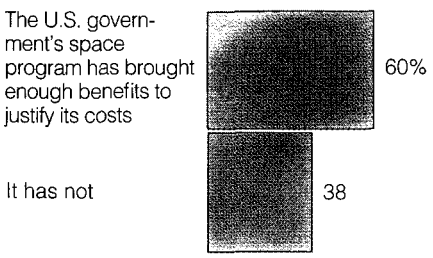
The Space Program

Question: **Which of the following comes closest to how you think of the space program? Is it...?**



Source: Survey by the Roper Center for Public Opinion Research for the National Science & Technology Foundation Medals, May–June 1996.

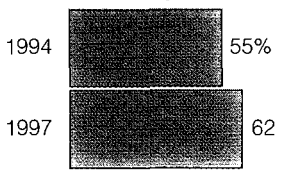
Question: **Do you think...?**



Source: Survey by ABC News, July 8–9, 1997.

Question: **Would you ...?**

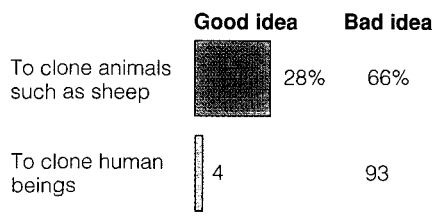
Favor United States sending astronauts to explore Mars

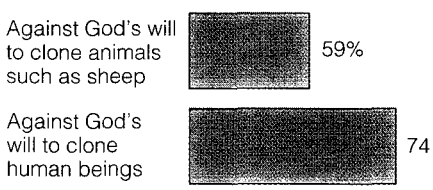


Source: Surveys by CBS News (1994) and ABC News (1997).

Cloning

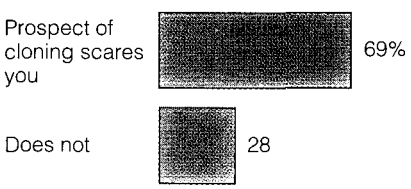
Question: **Do you think it is...?**





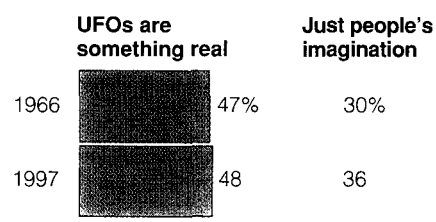
Source: Survey by Yankelovich Partners for *Time* and CNN, February 26–27, 1997.

Question: **In general, does the prospect ...?**



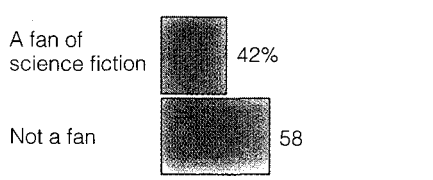
UFOs, Science Fiction, and "The X-files"

Question: **I have a few questions about unidentified flying objects, or UFOs. In your opinion...?**



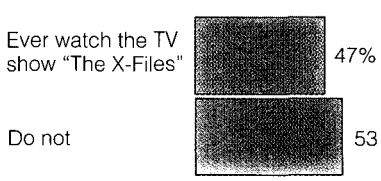
Source: Surveys by ABC News, latest that of June 1997.

Question: **Would you describe yourself as...?**



Source: Survey by the Roper Center for Public Opinion Research for the National Science & Technology Medals Foundation, May–June 1996.

Question: **Do you...?**



Source: Survey by Yankelovich Partners for *Time* and CNN, June 1997.

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ARGUING SCIENCE continued from page 61

cluded that "over a 30-year working lifetime, each I.Q. point earns [a person] something like $5,500." But wait a minute. Yale University psychologist Robert Sternberg, a long-time foe of I.Q. testing, asks, "How much does I.Q. buy you after you get out of college?" And contrary to Weiss, he asserts, "Not much." He adds, "A high I.Q. doesn't make you a better salesperson or a more creative artist or scientist, and it won't enable a doctor to work better with patients. Even college professors will fail if they don't know how to teach or get along with administrators."

Meanwhile, a National Wildlife Federation report cites a study of Taiwanese women who had inadvertently consumed some rice oil contaminated with PCBs and similar chemicals. "Researchers have followed 118 children of the women and an identically sized control group. Members of the exposed group have suffered developmental delays, growth retardation, and slightly lower I.Q.s."

And it's not only PCBs that are thought to harm I.Q. High levels of lead, too, are thought to act as a neurotoxin. The *Providence Journal-Bulletin* recently reported that "depending on the concentration, the effects [of lead] range from mild behavioral problems to permanent learning difficulties, along with a drop in I.Q."

The point is not whether I.Q. is something real, or whether environmental toxins actually reduce I.Q. The point is that the "truth" about I.Q. depends for leftists on what one wants to use it for, not whether it actually exists. If denying the idea of I.Q. justifies affirmative action in college admissions, then I.Q. is irrelevant. But if I.Q. tests can be cited to attack corporate polluters, then I.Q. is real and important. Consistency and evidence be damned, the result is all that matters.

Ronald Bailey is editor of the forthcoming *Earth Report 2000: The True State of the Planet Revisited* and producer of the forthcoming PBS documentary "Faith & Reason."

SPACE continued from page 67

business," a NASA spokesman told ABC's "Nightline" last year. If a U.S.-based contractor acted this way, congressional investigations and criminal probes would follow. Instead we hear blather about international cooperation. A cynic might wonder if we could accomplish more in space with the Russians as our enemies than as our friends.

Open hostility to competitive bidding practices. In many areas, NASA has simply become a subsidiary of one of the giants of the military-industrial complex. When Ron Utt, then President Reagan's director of privatization at the Office of Management and Budget, proposed in a small informal meeting that the number of competitive bids for NASA projects be increased, he received a threatening phone call from a powerful lobbyist. Hostility to competition has become part of the NASA culture. "The only people who like competition are the ones who don't have the contract," Utt told *TAE*.

A persistent neglect of unmanned alternatives. "In our judgment, the space station is a multi-billion dollar project of little scientific or technical merit that threatens valuable space-related projects and drains the scientific vitality of participating nations," concludes a recent statement signed by the heads of ten science organizations. This points to a larger trend at the space agency. NASA is perpetually cutting funds for its unmanned missions, which generate more scientific return than public relations gain, in order to spend more on shuttle missions. After all, floating astronauts capture the attention of network television—a key to maintaining NASA's political support. One University of Arizona space researcher said he is tired of coming to Washington to beg for small sums and to lobby to save the tiny budgets of mission teams that analyze the new data sent to Earth by satellites launched in the 1970s. NASA has already disbanded several of these teams, leaving the chirping satellites to transmit data to deaf ears. Some return on investment.

Can NASA be saved? Yes, but the agency needs radical surgery. The planned International Space Station should be eliminated. If there is any serious space science research to be accomplished, it could be quickly and cheaply done by simply buying *Mir* from the Russians and upgrading its electronics and safety measures.

NASA should be split into several smaller units: basic research, launch services, and space exploration. This would keep the new space agencies focused on their core missions and prevent infighting. The new space agencies should be freed from civil service rules and government ordering and purchasing requirements and operate like independent, government-owned corporations. Each of them should no longer be funded by a regular annual congressional appropriation, but receive funding only for reaching certain milestones (development of working prototype, successful launch, and so on) that are defined in advance. The new space agencies should not be compensated for costs of failure; if a rocket blows up or a satellite never phones home, the new agencies should suffer these losses. If these tough conditions lead them to privatize certain functions or to buy insurance on the private market, so much the better.

NASA's successors must be forced to behave like the old NASA—which put a man on the moon with a strict deadline, a tight budget, and an urgent sense of mission. Space travel is too important to be left to bureaucrats.

Richard Miniter is a frequent contributor to The American Enterprise.

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the Mail

I find it amazing that such an obviously intelligent group of people at the American Enterprise Institute can come up with nothing better than your July/August cover to depict the potential Asian influence on the global economy.

Maybe you have something interesting to say, and maybe your articles have something of merit in them, but I for one will not be reading them, nor will anyone in my personal or professional circle.

Thomas P. Kim
University of California, San Diego

I believe we both prefer to live in a peaceful America. So why the evil depiction of the menacing, hateful Asian on your July/August cover? To the thoughtful reader, such a cover cheapens your magazine. To the uneducated and bigots, it creates a scary image that is untrue and should not be propagated because it creates racial hostilities.

As the United States becomes increasingly diverse, it is incumbent upon the media to help make this a peaceful diversity. Why encourage cold wars? They are costly and useless.

Cora May Chin
Wheaton, Illinois

When I first looked at the cover of TAE's July/August issue and read the caption, "Is this the face of the twenty-first century?" I didn't realize it was an Asian. I thought it was James Carville, and I worried about our Republic: "Will we have to put up with him for a whole century?" Thank goodness he'll probably be either dead or in jail in a couple of years, like so many Clinton cronies.

Bill Irwin
via Compuserve

I read your day care issue (May/June) and must admit I became very disturbed. While I have numerous views that might differ from yours, I wholeheartedly agree with the conclusion that children are best cared for by their parents. But most parents know this already! They might not have known how bad the situation with hired care really is, but many do not have any choice.

You pointed out that the Swedes, despite a large tax burden, still prefer home care over day care and often forego a second income. I believe most Americans would do the same, but we do not have the social programs that make it possible for Swedes to afford staying home.

You also noted that the "well off" can afford the highest quality care, and certainly could afford to have one parent stay home. Unfortunately, in many parts of this country, making a decent living and feeding a family on one income is next to impossible.

Ingolf Gruen
University of Missouri

As a student, child care worker, and child advocate, I was delighted to find a cover story of a prominent magazine concerned with the many problems in child care. Having worked in three different child care settings, I commend your magazine for providing a clear picture of child care.

Still, I would point out that staying home is not as simple as you portray. True, many affluent parents could survive on one spouse's income. But many more families are unable to provide their children with basic needs unless both parents work.

Simply restricting aid to child care centers will not resolve the problem of child care. We need to make sure children develop in the optimal environment, wherever that may be.

Armen Babajanian
Los Angeles, California

As I read the articles on day care, I totally agreed that day care should be used as a last resort. Children need to identify with a single person who has a vested interest in the child's well-being.

The articles raise an important issue and are heartbreaking. I am reminded of the Soviet Union's attempt to make everything a collective effort: The country imploded under the delusion that the individual should be subordinated to the state.

Brett Elliott
Middletown, New York

In his 1978 Harvard address Solzhenitsyn referred to "a teacher in a faraway small college who could do much for the renewal and salvation of his country" but whom "the media will not provide… with a forum." In the bio line for my contribution to your symposium on Solzhenitsyn's speech, I am identified as that teacher ("Triumphant or Troubled?" July/August).

That's highly improbable. As far as I know, Solzhenitsyn became aware of my existence only two years after he spoke at Harvard. The text does not indicate he had any particular teacher in mind. I'm sorry for the miscommunication between the editors and me.

Edward Ericson
Calvin College

The American Enterprise welcomes your comments. Send to "The Mail," The American Enterprise, 1150 17th Street N.W., Washington, D.C. 20036. Or fax to (202) 862-5867. Or e-mail TheAmericanEnterprise@compuserve.com. Please include your address and phone number. Published letters may be edited for length and clarity.

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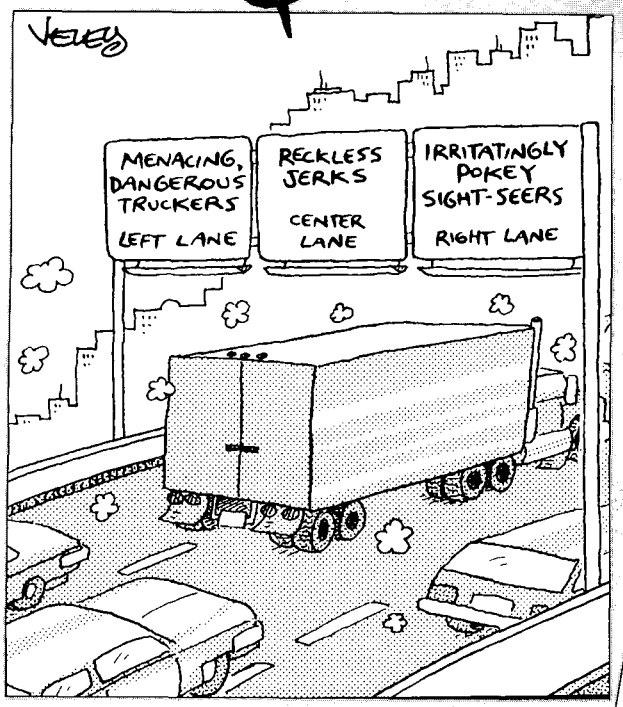

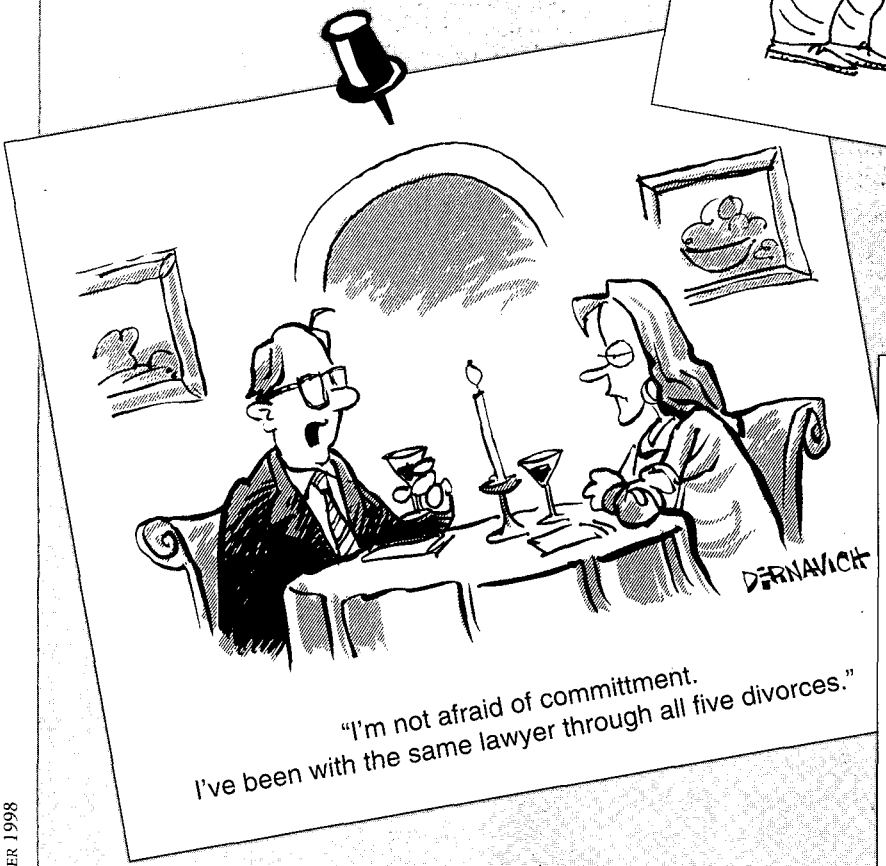

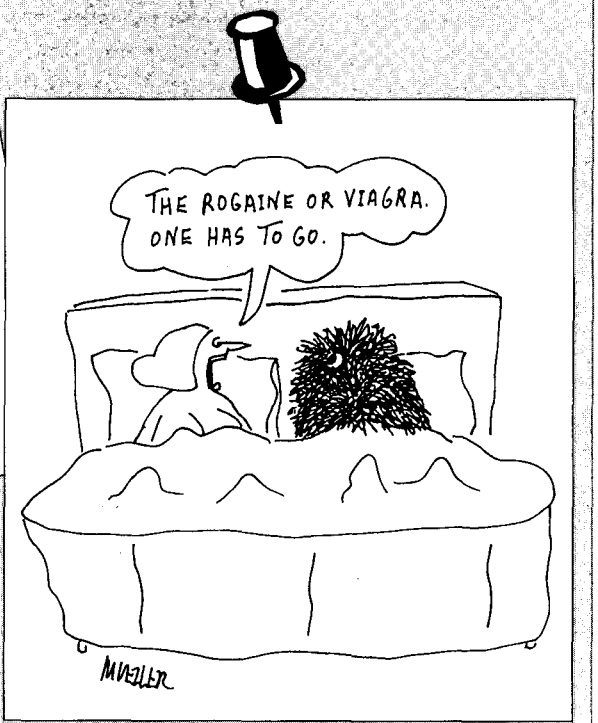

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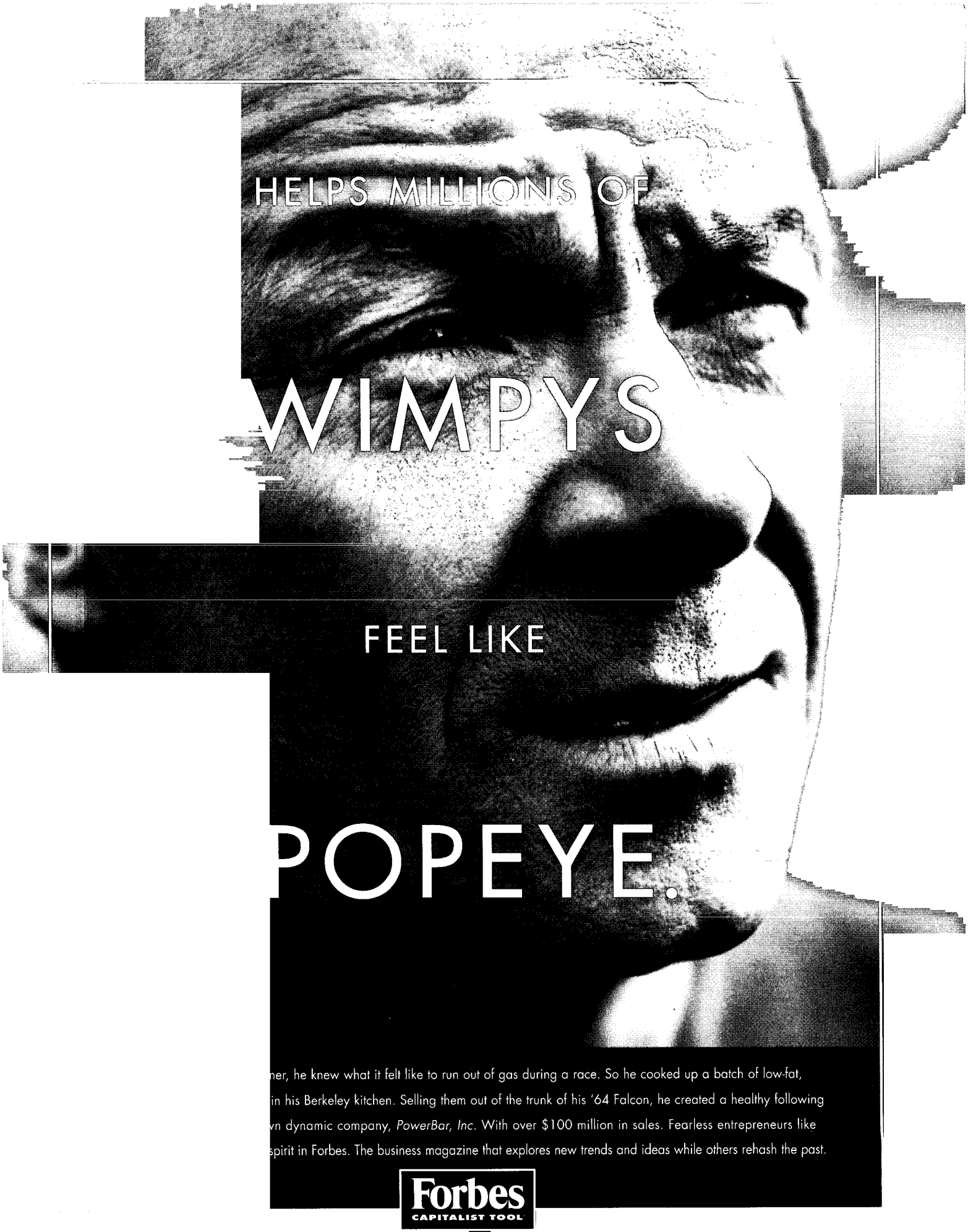

ner, he knew what it felt like to run out of gas during a race. So he cooked up a batch of low-fat,
in his Berkeley kitchen. Selling them out of the trunk of his '64 Falcon, he created a healthy following
vn dynamic company, *PowerBar, Inc.* With over $100 million in sales. Fearless entrepreneurs like
spirit in Forbes. The business magazine that explores new trends and ideas while others rehash the past.

Forbes
CAPITALIST TOOL

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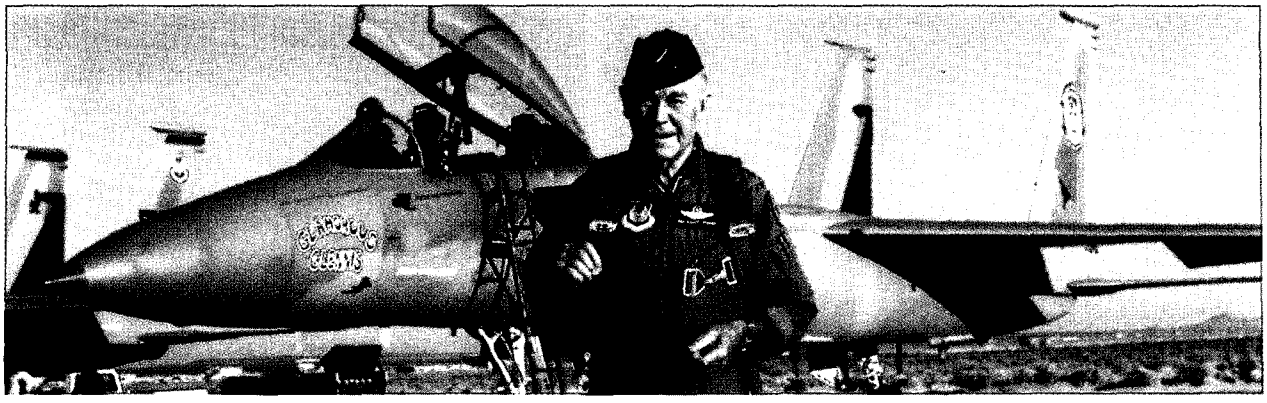

IN 1947, WHEN CHUCK YEAGER BECAME THE FIRST MAN TO BREAK THE SOUND BARRIER HE HAD A ROLEX CHRONOMETER ON HIS WRIST.

FIFTY YEARS LATER, YEAGER PUT ON HIS ROLEX AND DID IT AGAIN.

At 21, Chuck Yeager led a squadron of fighter pilots in World War II. At 24, he became the first person to fly faster than the speed of sound. And he remains a man on the move. "I don't jump off 15-foot fences anymore," says Yeager, "but I still enjoy flying a high-performance aircraft." And in October 1997 he did just that, breaking the sound barrier in an anniversary flight. "A pilot has to believe in his equipment. That's why I wear a Rolex," says Yeager. "I wore one when I broke the sound barrier in '47 and I still do today."

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